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ABSTRACT

The three papers in this collection discuss, respectively, the relationship of breastfeeding to human fertility, strategies to improve feeding of infants and young children, and infant feeding options for Thai professional women residing in Bangkok. Specific topics addressed in the first paper include the physiological role of lactation on fertility, and lactation in relationship to amenorrhea, anovulation, and pregnancy. The second paper focuses on problems of malnutrition in Third World countries and discusses the advantages of breastfeeding, the economics of breastfeeding at the national and individual level, ways infant formula is typically promoted, and strategies for controlling the promotion of infant formula. These strategies include legislative and educational plans as well as interventions based on Paulo Freire's method. The third paper reports findings of a small-scale preparatory survey examining one aspect of the process of modernization in Thailand: the increasing use among professional women in Bangkok of bottle feeding with infant formula. Data reported were gathered on a questionnaire concerning childbirth and infant feeding practices that was distributed to civil servants and to a network of colleagues and former students from Thammasat University. Infant feeding preferences and factors influencing the choice of infant feeding methods--including family structure, breastfeeding problems, medical facilities, promotion of infant formula, employment, and bottles as status symbols--are discussed. (RH)

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THE DECLINE OF THE BREAST

An Examination of Its Impact on Fertility and Health, and Its Relation to Socioeconomic Status

Edited by
Michael C. Latham

- Three Papers:
- I. The Relationship of Breastfeeding to Human Fertility,
by Michael C. Latham
 - II. Appropriate Strategies to Improve Infant and Young
Child Feeding, by a Cornell Working Group
 - III. Infant Feeding Options for Bangkok Professional Women,
by Penny Van Esterik

Cornell International Nutrition
Monograph Series
Number 10 (1982)

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- Number 10 (1982) "The Decline of the Breast: An Examination of Its Impact on
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Edited by Michael C. Latham (Three Papers: I. The Relationship
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II. Appropriate Strategies to Improve Infant and Young Child
Feeding, by a Cornell Working Group; III. Infant Feeding Options
for Bangkok Professional Women, by Penny Van Esterik)

Copies of the monographs may be obtained from:

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I. The Relationship of Breastfeeding to Human Fertility

by
Michael C. Latham

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1. Introduction

"Because I know
The customs of our people
When the baby cries
Let him suck
From the breast.
There is no fixed time
For breastfeeding.
When the baby cries
It may be he is ill;
The first medicine for a child
Is the breast.
Give him milk
And he will stop crying."

(from "Song of Lawino" by Okot p'Bitek)

For a very long time the traditional wisdom of many societies included a belief that lactation prevented or reduced the risk of pregnancy. Because every student of the subject could point to women who had become pregnant during the time they were still breastfeeding their infants, the belief tended to become relegated to that of an old wives tale. Scientific evidence now proves beyond question a positive relationship between lactation and length of post-partum amenorrhea, anovulation and reduced fertility. It also supports the view that breastfeeding is not a sure and safe prophylactic against pregnancy.

Despite these accepted facts there is much that is both misunderstood and not fully known concerning the impact of lactation on human fertility. It is also evident that existing knowledge has been insufficiently used either by nutritionists or family planners to further their own goals.

Breastfeeding is indisputably the most desirable method of young infant feeding especially in low income families in developing countries (Jelliffe and Jelliffe, 1978; Latham, 1979). For four to six months it can provide all the nutrients necessary for the healthful growth of the infant. After that other foods need to be introduced to satisfy the nutrient needs of the child, but breastfeeding can continue to provide a useful addition of energy, protein and other essential nutrients for many more months. The advantages have been reviewed elsewhere (Jelliffe and

Jelliffe, 1971; Latham, 1977). In contrast, bottle feeding of young infants in poor families with few facilities, and little knowledge of hygiene is a procedure fraught with danger for the developing infant. In many parts of the world it is a major cause of weanling diarrhea and nutritional marasmus both of which are an important cause of mortality. Gastro-enteritis and other intestinal infections arise from contamination of the bottle or the milk due to the fact that poor mothers often have little concept of the germ causation of disease; they do not have a safe source of water; they lack refrigeration, proper feeding bottles, and cleaning facilities; and they may have to struggle to attain enough fuel to heat the water for the milk preparation. Colostrum and breastmilk contain anti-infective substances which help protect the infant against infectious diseases, including diarrhea. Nutritional marasmus often results from overdilution of the breastmilk substitute due partly to ignorance, but mainly because of its high cost. In many developing countries the cost of providing adequate formula for a six month old infant is 25 to 60% of the mean family income (Latham, 1965).

Another neglected advantage of breastfeeding is the likelihood that this will result in a wider gap between children, because lactation has some effect on fertility. This is not to suggest that it offers a satisfactory alternative to modern contraceptive techniques, but in the absence of positive family planning methods, it is clear that other things being equal, mothers who breastfeed will on the average get pregnant less soon than those who do not (Rosa, 1974; Simpson-Hebert and Huffman, 1981). Western influence including the promotion of breastmilk substitutes such as formula has resulted in a great increase in early bottle feeding of infants in low income countries and has been harmful not only because it is an important indirect cause of morbidity and mortality of infants, but also because it contributes to narrower spacing of children and also to the population explosion.

2. The Physiological Role of Lactation on Fertility

The physiological mechanisms by which human lactation influences ovulation and menstruation are not yet fully understood. It is now believed that nipple stimulation, mainly through sucking of the infant on the human breast, results in hypothalamic suppression of the prolactin inhibiting factor. Sucking therefore influences the anterior pituitary gland to release prolactin (Delvoye et al., 1977). This hormone stimulates milk synthesis and secretion, and also represses ovarian activity (Jelliffe and Jelliffe, 1978).

It appears that the frequency, intensity and duration of suckling are probably the most important determinants of the length of post-partum amenorrhea and on the time when ovulation returns in mothers, following the birth of an infant. Therefore, in women exposed to sexual intercourse, all other things being equal, the most important physiological factor influencing the spacing of births appears to be breastfeeding, and especially its frequency, intensity and duration.

It is well established that lactation is dependent on two hormones, namely oxytocin and prolactin. Oxytocin is responsible for the let down

reflex in breastfeeding and has an effect on the uterus, but it does not appear to play a major role in fertility. On the other hand, prolactin is the hormone which controls milk production. The pregnant woman has high levels of prolactin even though she is not lactating (Noel et al., 1974). But it is believed that the high levels of estrogen present during pregnancy inhibit milk production. Soon after birth there is a drop in the mother's estrogen levels, while prolactin levels remain high, and often rise. If the mother breastfeeds her baby, then nipple stimulation will result in the maintenance of high prolactin levels.

In the presence of continued nipple stimulation resulting from frequent and intense breastfeeding, prolactin levels remain high, but over a period of many months levels do gradually drop. These high or relatively high levels of prolactin are generally believed to maintain lactational amenorrhea. For each mother, as prolactin levels gradually fall, there is probably a trigger level reached, where menstruation resumes. But this is many months after delivery, provided that adequate stimulation is provided to the nipples.

There is the possibility that sucking itself, through certain neural pathways may be responsible for postnatal amenorrhea and anovulation. This view is supported by a study in lactating monkeys. Despite an inhibition of prolactin secretion, there was still a suppression of gonadotrophin secretion and continued amenorrhea (Schallenberger and Knobil, 1980) presumably stimulated by sucking. Sucking is also believed to be associated with low levels of gonadal steroid hormones (Konner and Worthman, 1980) including progesterone and serum estradiols.

If sucking alone is responsible for post-partum amenorrhea, then the observed elevation of prolactin levels in lactating women may be only a concomitant phenomenon, and an indication of altered hypothalamic activity. But it seems more likely that prolactin itself is suppressing ovarian activity and playing a direct role in lactational amenorrhea. Research is needed to clarify these mechanisms.

3. Lactation and Amenorrhea

A number of studies have been undertaken in which a relationship has been sought between lactation and length of post-partum amenorrhea (Huffman et al., 1980; Prema, 1979). It seems that the median duration of amenorrhea following childbirth is about 7 weeks in the absence of lactation (Sharman, 1951; Peckham, 1934). Because the distribution is skewed the mean figure is in the order of 10 weeks. In lactating women the duration of post-partum amenorrhea varies enormously being largely dependent on the intensity, frequency and duration of breastfeeding. A study in Bangladesh (Chen et al., 1974) reports amenorrhea of 18 to 20 months in women who fully breastfeed their infants for 6 to 9 months and whose infants received rather little in the way of supplementary foods during their first year of life.

Salber et al. (1969) reported that the median duration of amenorrhea was 55 days for those mothers who never lactated and 56 days for those who lactated for less than a month in Massachusetts. In this study the

duration of amenorrhea increased with the duration of lactation at least up to a lactation duration of 6 months. The data from their sample suggested that the median duration of amenorrhea increased by about half a month for each month's increase in duration of lactation. Contrary to studies done elsewhere, they found that with duration of lactation between 6 and 10 months there was no consistent further increase in duration of amenorrhea. However, their sample in these categories was small and it was not stated how full was the lactation in these subjects. Among women who did not lactate, menses had returned in 91% by the third month after delivery compared with 26% in those lactating. However, menses had returned in over 60% of women who were still lactating at 6 months after delivery. The data for this study were obtained from 2197 self-administered questionnaires.

In another old study in the United States, Peckham (1934) reported that 2885 lactating women with a mean lactation duration of 8.5 months had a mean of 5.4 months of amenorrhea. In 34% of the women menses began within 2 months of delivery and by 6 months 70% had menstruated.

In contrast to these U.S. studies, somewhat different results have been obtained in other countries. Peters et al. (1958) state that in a study in South India (WHO, 1954), 296 women were interviewed who were nursing a child and who reported that they had not menstruated since delivery. The age of the children of 63% of these women was 12 months or less; 21% nursed children between the ages of 13 and 18 months; in 14% of the women the amenorrhea continued though their children were 19 to 24 months old. In the remaining 2% the amenorrhea had lasted more than 24 months. These data though interesting are less valuable than they should be since the number of women interviewed at these clinics who were menstruating and the age of their children is not given.

Peters et al. (1958) in their own study of 272 lactating women attending a birth control clinic in Bombay found that 15% of mothers with infants 1 to 4 months of age had already menstruated since delivery, 33% of those with infants aged 5 to 8 months, and 67% of those with children aged 9 to 12 months had had a menstrual period. Among the 31 women with children 13 to 18 months of age only 55% had menstruated since delivery and it was even reported that 19% of 21 women who were breastfeeding babies older than 18 months were still amenorrheic. This very long duration of amenorrhea is quite different from the U.S. figures quoted earlier. The nutritional status of these women was not determined but they were said to come from low income groups. The authors themselves wonder whether the long amenorrhea might not be similar to that reported in famine conditions.

There is much other data from India. A study in the Punjab (Putter et al., 1965) reported that the median length of amenorrhea of mothers whose child had died in the first month of life (non-lactating mothers) was 2 months and that of mothers whose child had survived past one year (assumed to be mainly lactating mothers) was 11 months. Baxi (1957) in Bombay reported that 523 women with a mean length of lactation of 16.5 months had a mean duration of post-partum amenorrhea of 11.9 months.

In Egypt (Kamal et al., 1969) it was reported that one-third of lactating women have their first menstruation within 3 months of delivery and by the ninth month two-thirds have menstruated. In this study 13% had not had a menstrual period by the fifteenth post-partum month.

Some newer data from the United States (Kippley and Kippley, 1972) reports on a group of women who breastfed at frequent intervals often for long periods of time. They reported that post-partum amenorrhea in these women lasted often for longer than 1 year (mean duration was 14.6 months). Their findings are similar to those reported from non-industrialized countries. This suggests that length of post-partum amenorrhea is much more a factor of infant feeding practices rather than due to ethnic differences.

There is still some doubt about how often ovulation actually precedes the first menstrual period or the first spotting which occurs post-partum. It is now believed that this is affected by the pattern of lactation. It seems (Perez et al., 1971; Perez et al., 1972) that ovulation prior to menstruation is less likely early in lactation, and in those women who are fully breastfeeding their infants. In contrast, if breastfeeding is partial or is suspended, ovulation commonly occurs prior to the initial onset of menstruation post-partum. In a study in India about 12% of women (Das and Mitra, 1961) were believed to have ovulated before their first post-partum menstrual period.

Because, for most women there is either no ovulation or only one ovulation prior to the first post-partum menses, there is said to be a low rate of pregnancies prior to the resumption of menstruation. A recent review (Simpson-Hebert and Huffman, 1981) suggests that the percentage who become pregnant during lactational amenorrhea ranges from 1.5 to 13%. This is true for the 16 studies reviewed in Bangladesh, Canada (Eskimos), Chile, Egypt, India, the Philippines, Rwanda, Taiwan and the United States. The lowest percentage (1.5%) was from a study in India and the highest (13%) was from a study in the United States. But comparisons of studies done by different scientists in different cultural groups must be viewed with extreme caution. The differences of findings in the particular women studied in India and the U.S. are very likely due to differing practices in the two cultures--factors such as the duration of lactation, the intensity of breastfeeding, the introduction of infant feeding other than breast milk, the post-partum exposure to sexual intercourse and others.

The likelihood of conception is believed to be much lower in the earlier, compared with the later, months of lactational amenorrhea (Van Ginniken, 1977). The duration of lactational amenorrhea and the intensity of breastfeeding needs to be stated in reports if comparisons are made of rates of conception prior to menstruation.

It was my observation in Ireland in the 1950's and in Tanzania in the 1960's that many women who practiced breastfeeding on demand for long periods of time, often went through several pregnancies without menstruation. In fact among poor Roman Catholic women in Ireland it was sometimes said, half in jest, that after the first pregnancy

"menstruation was a pathological condition." Sheps (1965) reports a similar situation for Hutterite women in the United States. Hutterites do not practice birth control and apparently often have several consecutive pregnancies without intervening menstruation.

There are many data to show that the mean length of lactational amenorrhea varies widely around the world. But the evidence suggests that the differences are probably not mainly (if at all) due to ethnic physical or physiological differences, but are more a factor of infant feeding practices including the frequency, intensity and duration of breastfeeding. At present there is no convincing evidence that the length of post-partum amenorrhea would be different in African, American, Asian or European women living under similar conditions and practicing identical infant feeding regimens. Perhaps human pair feeding studies are necessary (though probably not possible) to prove this point.

But there are very important cultural, social and environmental factors which play a role in the length of lactational amenorrhea. These include infant feeding practices, for example demand versus scheduled breastfeeding, different practices of night feeding including whether the infant does, or does not, sleep with the mother, the timing and extent of the introduction of other foods, etc.; the use of dummies or pacifiers; and others. The age, parity, health, previous lactational history and possibly the nutritional status of the mother may also affect the length of post-partum amenorrhea.

There is evidence that younger women resume post-partum menstrual bleeding earlier than older women (Chen et al., 1974). It seems that parity may have an effect which is independent of age, but this is not proven. Various diseases in the mother may result either in abnormal uterine bleeding or in amenorrhea. Certain health conditions in the mother or infant may affect breastfeeding, which in turn affects the length of post-partum amenorrhea.

Starvation may cause a cessation of regular menstruation in women of child bearing age (Latham, 1979), and presumably may also delay the onset of menses following birth. Although it has been postulated that differences in lengths of post-partum amenorrhea might be directly related to the nutritional status of the mother (Frisch and McArthur, 1974), the existing evidence seems to contradict this hypothesis. Only in extreme conditions of gross undernutrition or malnutrition does menstruation cease. Several papers which have tested the Frisch and McArthur (1974) hypothesis find it to be untrue. The analyses of Bongaarts (1980) and Huffman et al. (1978) from women in different parts of the world show no significant relationships between lengths of post-partum amenorrhea and the nutritional status of the women studied. The evidence suggests that it is only in rather serious malnutrition or starvation that post-partum amenorrhea is much affected.

The results of a recent study on data collected in Malaysia suggests that all previous breastfeeding activities may affect the duration of post-partum amenorrhea (Habicht et al., 1981). The analysis using complex statistical techniques was based on the 1976-77 Malaysian

Family Life Survey. The results suggest that even a few days of breast-feeding immediately after birth may have an effect in prolonging the length of the period of post-partum amenorrhea, compared with women who did not breastfeed at all. The authors state that this effect is similar whether the infant is fully or partially breastfed. The results also show that increased parity lengthens the period of post-partum amenorrhea.

These findings are of considerable interest because they differ from results of many earlier studies. The statistical methods used deserve the attention of those who in the future plan research in this area.

However, the nature of the survey which generated the data for this research could affect the results. The retrospective study was based on a questionnaire to obtain female retrospective life history data "including details on each pregnancy, the dates of resumption of menstruation, the duration of full and partial breastfeeding, etc. from women less than 50 years of age." Caution is justified in interpreting such results. Those reporting on the analysis did not themselves collect the data. There is no foolproof way of testing the accuracy of the information given by women about their lengths of post-partum amenorrhea and of full and partial breastfeeding for events that may have occurred 20 or more years previously. It should also be kept in mind that retrospective data of this kind cannot be generalized to the whole population, because the respondents are the surviving population of women, and may not be representative of the actual population of 20 years ago.

But the relatively large sample size and the bold attempts by the researchers to use statistical techniques to rule out inconsistencies and misreporting biases, adds to the interesting results reported. Prospective studies may be necessary to settle some of the questions raised.

A study in the Gambia has suggested that nutritional factors including supplementary feeding may importantly influence both prolactin levels and length of post-partum amenorrhea in lactating women (Lunn et al., 1980). The authors state that plasma prolactin levels were higher during periods of food shortage when energy intakes were low, and that an intervention consisting of the provision of food supplements to lactating women lowered prolactin levels. Based on hormonal studies, including a determination of estrogen levels, amenorrhea lasted a mean of only 10 months in those supplemented. This is compared with non-supplemented Gambian women who are reported to have 16 months of post-partum amenorrhea. But the study design does not make such comparisons entirely appropriate. The authors suggest that supplementation may result in shorter birth intervals, at any rate, under conditions that exist in the Gambia. They speculate that poor nutritional status leads to increased levels of prolactin, as a natural mechanism to maintain adequate breast milk production, even under circumstances that may have adverse effects on the health and nutritional status of the mother. The results from this Gambian study are not supported by most other research, in which nutritional status was not found to be related to lactational amenorrhea (Huffman et al., 1978; Bongaarts, 1980). It seems possible that it was not supplementation per se that influenced prolactin levels and length of post-partum amenorrhea, but rather that reduced levels of

milk supply may have led to increased sucking and nipple stimulation which in turn increased both prolactin levels and lactational amenorrhea.

Certainly the Gambian findings should stimulate more research in this area. But the overall evidence now available suggests that the moderate degrees of undernutrition have only a minor effect on lactational amenorrhea, and that supplementing the diets of lactating women is not likely directly to influence fertility.

4. Lactation and Anovulation

The previous section of this paper has reviewed the relationship between lactation and duration of post-partum amenorrhea. The appearance of the first menses is not necessarily an indication of the first post-partum ovulation. It is possible to ovulate and, therefore, to become pregnant before menstruation has returned. In general, ovulation precedes the first menstrual period by about 10 to 15 days. The first post-partum ovulation is believed almost always to be followed by menstruation within a month, unless the woman becomes pregnant. But there may be one and possibly more menstrual periods prior to ovulation. A number of research workers have investigated the time of onset of ovulation post-partum, in both lactating and non-lactating women. Ovulation can be detected using several different methods, all of which are indirect. These include the daily measurement of basal body temperature, the microscopic examination of material obtained by endometrial biopsy and the estimation of hormone levels in urine.

A study in Edinburgh (Sharman, 1951) used the endometrial biopsy technique. In those who were not lactating 100% of women who had their first menses within six weeks post-partum were judged to be anovular; 50% who had their first period during the seventh week were anovular; and 33% who had their first menstruation after more than seven weeks were anovular. In contrast, all the first menstruations in the lactating group were anovular.

An earlier study in the United States (Kuzrok et al., 1937) involved 30 lactating women all of whom had resumed menstruation. Of 106 fairly regular cycles, 39 were judged on the basis of endometrial biopsies to be ovulatory, 45 anovulatory and 22 were difficult to interpret. The days between delivery and the first post-partum period ranged from 20 to 130 days. The data were presented in a manner which makes interpretation difficult.

Topkins (1943) reported on a study in which serial biopsies were performed on 28 lactating women, none of whom had menstruated since delivery. A total of 145 endometrial biopsies were taken from as early as 6 weeks to as late as 31 weeks post-partum. Ninety-four percent of the biopsies were estrogenic and only 6% progestational, and all of these latter were associated with the onset of the first menstrual flow. The conclusion was reached that in lactational amenorrhea there is inhibition of ovarian activity due to suppression of pituitary gonadotrophic activity, and that this may be due either to prolactin or possibly to an internal secretion of the lactating mammary gland.

In a study in Illinois, Udesky (1950) varied the procedure by including biopsies on lactating women both before, and sometimes following, their first post-partum menstruation. A total of 200 endometrial biopsies were taken from 85 normal lactating amenorrheic women. Ninety-eight-and-a-half percent of these were estrogenic. Only 3 cases (1.5%) were luteal or progesterational, and all 3 were followed very soon by the first menstrual period. Thirty-six lactating women were biopsied just before, or just after, the first post-partum period. Evidence of ovulation was found either just preceding or following the first menstrual period in 14%. Udesky concludes that in amenorrhea during full lactation the suppression of the ovarian cycle is almost complete. When ovulation does occur it invariably heralds the approach of the menstrual period unless pregnancy intervenes. During lactation the suppression of the ovarian cycle is gradually lifted so that in 14% of his population ovulation occurred in the first post-partum period and in over 28% ovulation occurred only after three or more periods. He suggests that suckling has a direct influence on the secretory activity of the hypophysis leading to the production of prolactin plus some unknown factor which inhibits the ovarian cycle.

In discussing Udesky's work, Davis (1950) mentioned that he had performed serial endometrial biopsies in women six weeks after delivery and at the onset of each bleeding period until a regular menstrual pattern was established. He followed 50 non-lactating women for an average of one year. He found that the first menstruation was rarely ovulatory, the second was ovulatory in about 50% of women, and all women had typical ovulatory progesterational changes in the third menstrual period.

Other studies (Lass et al., 1938) using the endometrial biopsy method show similar results to those in the studies of Sharman, Topkins and Udesky discussed above.

The effects of lactation on ovulation were more recently studied by Cronin (1968) in England using basal temperature measurements to determine ovulation. A total of 174 women participated in the study. Ninety-three of these did not attempt to breastfeed their infant and 81 did. The mean length of time for the return of menstruation in the non-lactators was 58.9 days (49% had resumed menstruation by 56 days and 90% by 84 days), and of first ovulation, as judged by rise in basal body temperature, was 73.5 days after delivery. One-third of those not breastfeeding at all ovulated before their first menstrual period. Cronin's data on the 81 women who did attempt to breastfeed is more complex and difficult to interpret because as in so many industrialized countries the mothers even of very young infants often partially breastfed their babies and many breastfed for only a short period of time after the birth of the infant. A surprising finding was that those 28 women who attempted breastfeeding, but did not continue beyond 28 days, resumed menstruation significantly earlier (mean 43.5 days) than did the non-lactators (mean 58.9 days). However, the mean time of first ovulation of this group of poor or unsuccessful breastfeeders was 70.7 days which was not significantly different from those who did not attempt breastfeeding. The more prolonged periods of lactation were associated with longer periods of amenorrhea and of anovulation. These ranged from

77.7 days of amenorrhea and 104.7 days of anovulation in those breast-feeding from 29 to 56 days, up to around 144 days of amenorrhea and 155 days of anovulation in those breastfeeding for periods from 113 to 196 days. The evidence from this study again shows that prolonged lactation increases the length of post-partum amenorrhea and anovulation, and that very short periods of lactation apparently have no effect. This is contrary to the findings reported by Habicht et al. (1981) in the retrospective study of Malaysian women mentioned earlier.

5. Lactation and Pregnancy

Menstruation following child birth provides in the eyes of many women an indication that she may again be fertile. As has been indicated this is not an entirely reliable index. Ovulation when it begins again indicates a potential for pregnancy. There is, however, a rather substantial literature relating lactation to pregnancy. It is not intended here to attempt a comprehensive review of all published data in this area but rather to draw conclusions based on some of the studies done.

The recent WHO Collaborative Study on Breastfeeding (WHO, 1981) conducted in 11 countries gave a range of 1 to 11% of women who said that their last pregnancy had occurred during a period of post-partum amenorrhea. Two of the 9 countries were industrialized (Sweden and Hungary) and the others were non-industrialized developing countries.

There are two ways by which lactation may have an effect on the interval prior to the next pregnancy. First, it may reduce exposure to sexual intercourse for a number of reasons, especially because of cultural beliefs and practices suggesting long periods of abstinence from intercourse post-partum or during lactation. Second, it can prevent conception by delaying ovulation and therefore have an effect even in the presence of equal exposure to intercourse.

In some cultures a taboo against intercourse may extend for as long as two or more years (Cronin, 1968; Goody, 1967) post-partum, and may or may not relate to lactation (Bleek, 1967). In many societies it is believed that pregnancy has a harmful effect on the quality of breast milk and may therefore be detrimental to the welfare of the child being breastfed. Some people believe that sexual intercourse per se may effect the quantity or quality of breast milk, or that the act itself during lactation may have a harmful effect on the mother, the child, or even the family.

Particularly in black Africa certain cultural groups proscribe sexual intercourse for longish periods post-partum or for the duration of lactation. This will lengthen the birth interval if abstention is extended beyond the period of anovulation. Most of these societies still practice prolonged breastfeeding and on demand infant suckling, and so post-partum amenorrhea and anovulation is likely to be long. However, with modernization, women in these societies, especially those who are younger and more educated, probably breastfeed less, more often supplement the breast with the bottle, and are likely to abstain from sexual intercourse for shorter periods of time.

It is also likely that husbands in certain African societies find abstinence from sexual intercourse with a wife following delivery much easier to follow if they have more than one wife. Therefore, the decline in polygamy may also serve to reduce the practice of post-partum abstinence. In the absence of acceptance of family planning, these factors may contribute to a narrowing of birth intervals.

In many studies, and in much that is written, it is stated that the commonest cause of stopping breastfeeding in a number of developing countries is because of a new pregnancy. Thus, Kamal et al. (1969) in Egypt reported that pregnancy was the most common cause of weaning among women in their study. This has been reported to be the case in many (Jelliffe, 1968; Jelliffe and Jelliffe, 1978) other societies. However, Morley (1967) reports that despite the fact that many Nigerian women in his study stated that pregnancy was the cause of cessation of breastfeeding, he found that this was not the case in many instances. Checking the date of cessation of breastfeeding and the date of the next delivery, he found that there was often a gap of 1 to 3 months between cessation of lactation and conception. He believes that mothers are stopping breastfeeding because they have begun cohabiting again with their husbands. In much of Africa the period of abstention from sexual intercourse practiced after delivery is considerably shorter than the period of lactation. Pool (1969) reported that in Ghana the average abstention for first births was 7.3 months in rural areas and 7.7 months in the towns, while the average length of lactation for first births was 17.0 and 11.4 months, respectively.

Knodel et al. (1967) have reviewed several important studies which relate lactation to birth intervals. One of the most important of these relates to French data collected 230 to 300 years ago from the parish registers of Crulai in Normandy. This is the research of Gautier and Henry (1958). Knodel reports:

"They found good evidence (from the shape of the marital fertility curve and the duration of birth intervals classified by birth order) that fertility control, as defined above, was not practiced to any significant extent at that time in Crulai; there was little evidence, direct or indirect, on the extent of breastfeeding, but the authors note that 'since we are dealing with a rural, ancient population, we may be confident that breastfeeding was the rule, and that it lasted for a long time.' Because the death of a breastfed child would interrupt lactation, the length of the interval between births when the child dies in infancy may reflect the effect of breastfeeding on the resumption of ovulation. Henry compared the average length of the birth intervals after a child died before the age of one year, with the 'normal' intervals when the child had survived beyond that age. He attributed the average difference of about nine months--between 20.7 months and 29.6 months respectively--to the effect of lactation on the anovulatory period. Henry also considers the possibility

of an opposite causal sequence--an early pregnancy causes an interruption of breastfeeding, which in turn results in the death of the prematurely weaned child. In this interpretation, a selection process would associate mothers whose infants died young with shorter birth intervals. He is able to show, however, that the death of the child antedated the presumed conception time in a overwhelming majority of cases."

A somewhat similar study in French Canada in the eighteenth century uses the same assumptions about universal extended breastfeeding and absence of birth control, and utilizes data on infant deaths. In these data Henripin (1960) shows that with death at 0 months the mean length of birth interval was 19.3 months, with death at 1-6 months birth interval was 18.3 months, with death at 7-11 months birth interval was 23.6 months, and with death at 1 year or over mean birth interval was 25 months. The differences in birth intervals were attributed to the effect of lactation on the ability to conceive.

Using this same demographic technique and similar assumptions Knodel (1967) reports on a study conducted in the Cocos-Keeling Islands (Smith, 1960). The findings are like those in Canada in that the average birth interval rose steadily according to the length of survival of the child. For example, the birth interval following a stillbirth was 1.43 years; following a death before 0.1 year was 1.70 years; following a death between 0.4 and 1.0 years was 2.14 years; and when the child survived past 2.0 years the birth interval was 2.45 years.

A study of American Hutterites in 1953 (Sheps, 1965) showed that intervals between births were relatively short even though these women practiced breastfeeding, apparently until the next pregnancy supervenes. Many of these women never menstruated between their first and last pregnancy. The authors did not suggest a reason for these results which conflict with other findings. However, Huntington and Hostetler (1966) provide a convincing explanation based on their own work among the Hutterites. They suggest that the amount and intensity of suckling is reduced in the Hutterites compared with many other communities who practice breastfeeding. This is due to rigid community schedules giving the mother little opportunity for relaxed nursing, the extensive use of pacifiers which the babies suck, and the fact that nursing does not seem to be "particularly enjoyable or rewarding" to Hutterite women. More important than these subjective reasons might be evidence to suggest that solid foods are usually introduced into the diets of infants prior to six weeks of age and thereafter in increasing amounts. Therefore, though breastfeeding continues it may in the late months be providing only a small dietary supplement and the breast itself is serving as a pacifier.

The Khanna Study (Potter et al., 1965; Wyon and Gordon, 1971) carried out between 1955-59 in 11 Punjab villages provides some of the best available data and was part of a well conducted comprehensive study. It is based on a sample of 1500 women of childbearing age; it was both a prospective and retrospective study; and it included monthly visits

to women over a 3 to 5 year period. The study population comprised women who normally practiced prolonged lactation (mean 18 months and median 21 months); who had a high level of fertility (women 45 and over had a mean of 7.5 children ever born); and who had a mean post-partum abstinence from intercourse of 6 months. The data from this study is most cogently presented in life table form showing the probability that a woman will be amenorrheic, still lactating or not yet pregnant at successive months after delivery (Table 1).

Table 1. Proportion of wives in post-partum amenorrhea, lactation, and not yet pregnant at end of specified number of months following birth of infant that survived 1 month or more (presented in life table form). Taken from Potter et al.

Months since previous delivery	In post-partum amenorrhea ($l_1 = 1418$)	Still lactating ($l_1 = 1415$)	Not yet pregnant ($l_1 = 1418$)
0	1.00	1.000	1.000
1	.94	.999	1.000
3	.86	.996	.996
6	.74	.98	.98
12	.43	.89	.89
18	.17	.60	.62
24	.07	.41	.47
30	(.03)*	.26	.35
36	---	.16	.29

*Based on the experience of less than 25 women.

In the Khanna women the mean length of post-partum amenorrhea was 10.78 months. The mean length of time between pregnancies was 32.64 months. The authors point out that this consists of (in addition to the period of amenorrhea) a 10.70 months of menstruation, a 2.16 months of time added by pregnancy wastage, and 9.00 months of gestation. They conclude that the fact that the Khanna villagers have an average birth interval several months longer than the mean birth interval of 26 months recorded for Hutterite women, is not primarily because the villagers are slower to conceive or experience heavier pregnancy losses. It is because their post-partum amenorrhea lasts several months longer as a consequence of prolonged breastfeeding. Another finding in the Khanna study was that older women lactate longer (14 months for women 20-29; 16 months for women 30 and over); were amenorrheic longer (10 months for women 20-29; 12 months for women over 30); and took longer to conceive than younger women.

A case history study in the United States involving 148 women in New Mexico was designed to determine to what extent breastfeeding protects the mother from pregnancy (Gioiosa, 1965). In 500 pregnancies in these women there were 46 cases (9.2%) in which pregnancy occurred

during lactation, and 60% of these occurred after the ninth month of breastfeeding. The authors concluded from their data that lactation does not offer the same degree of protection from pregnancy when supplementary feedings are given. This is a view previously expressed by Rice (1944) and now shared by most modern day workers in this field.

In a review of the literature Tietze (1961) hypothesized that lactation may delay pregnancy even after ovulation, by interfering with the process of implantation through nervous or hormonal action on the uterus, and suggests that research is needed in this area. Tietze suggested that breastfeeding though not superior to "effective" contraception at any time period may be superior to "ineffective" contraception up to about 10 months post-partum. He concluded that "the risk of conceiving during post-partum amenorrhea is comparatively small, perhaps of the order of 5 per cent. It increases rapidly after menstruation has returned. If the next pregnancy is to be prevented or postponed then effective birth control needs to be started straight after the first menses, or better still just before."

Two decades later these views of Tietze seem to still be true. Recent reviews seem to support them (Jelliffe and Jelliffe, 1978; Simpson-Hebert and Huffman, 1981).

6. Discussion

The high economic costs of a shift from breastfeeding to bottle feeding have been considered by various workers (McKigney, 1971; Greiner, et al., 1979). It was estimated in 1963 that if Tanzania shifted to bottle feeding it would cost 22 million dollars per annum, mainly in hard currency, a sum very much larger than the budget of Tanzania's Ministry of Health (Latham, 1967). In many countries the cost of purchasing adequate formula for a 6 month-old infant is over 50% of the minimum wage (Latham, 1977).

The data from the studies relating lactation to pregnancy intervals provide strong evidence that the intensity of lactation is a factor. It seems that a mother who is breastfeeding her baby frequently, who is having her breasts fully emptied, and who is subjected to a considerable amount of nipple stimulation through sucking, is likely to have a longer post-partum interval of anovulation than is the woman who breastfeeds her child irregularly and for shorter periods of time. Future research needs to divide women according to intensity as well as duration of lactation. In several studies described here this factor, if considered at all, was not covered in adequate detail.

The research on the effects of malnutrition and poor diets on ability of mothers to breastfeed and on menstruation and ovulation was not fully reviewed here. There are data from famine areas to show that starvation causes an interruption in menstruation. The fact that severe maternal malnutrition reduces fertility has been termed "a sound logical device of nature to protect the malnourished mother from the rigours of pregnancy and childbirth" (Latham, 1964). But there is much evidence

that moderately undernourished women conceive, and give birth to infants, albeit of lower than desirable weight. These women usually go on to breastfeed their infants.

Varying views about lactation and desired family size may have different results in different societies. A Turkish demographer has reported (Osby, 1971) that women in Turkey often breastfeed their infants as a means of birth control believing that it will delay the next pregnancy. The arrival of the pill and the loop has removed this incentive to breastfeed, and may be resulting in a shift to bottle-feeding in those using family planning services. In Ethiopia it has been reported (Knuttson and Mellbin, 1969) that a frequent reason for the early termination of breastfeeding was that otherwise the mother will not have more children.

Knodel (1977) estimated that during a 25 year reproduction period, a woman who artificially feeds her infants and who does not practice modern contraception will bear an average of 12.88 children. He estimates that if breastfeeding leads to a median of 10.6 months of amenorrhea, women will bear 9.46 children, and with 17.7 months of amenorrhea only 7.77 children. Data from rural women in Ghana (Bleek, 1976; Greiner et al., 1979) suggest that the median length of post-partum amenorrhea is about 12 months. If this holds for all Ghanaian women, interpolation from Knodel's data would suggest that if Ghanaian women switched from breast to artificial feeding, all else being equal, the number of children born per woman would increase from a mean of 9.13 to 12.88, a 41% increase (Greiner et al., 1979). These figures, of course, ignore changing uses of modern contraceptive methods.

But clearly in Ghana, and in many other developing countries where breastfeeding is still widely practiced and modern family planning methods are not very widely used, breastfeeding contributes very substantially to a reduction in fertility. In certain African countries like Kenya fertility rates are alarmingly high, breastfeeding is on the decline, modern contraceptives are properly used by only a tiny minority of couples, and death rates are rapidly falling. These four factors are leading to alarmingly rapid increases in the population. The protection of breastfeeding may be the best single strategy to reverse the trend of increasing population, and unlike family planning methods, such a strategy will provide other benefits such as improved infant and child health, reduced malnutrition and economic advantage to the family and the nation.

Of course there is much sense in linking, and even in integrating, nutrition (including promotion of breastfeeding), family planning, and health activities into one program (Latham, 1979). There are several basic strategies to encourage the use of breastfeeding. On the one hand, there is the need to strengthen traditional beliefs where prolonged breastfeeding is still the norm. This is a preventive approach and a part of it is to know the determinants of changing infant practices, and to take steps to mediate or eliminate the most important factors causing this change. On the other hand, there is the need for a more "curative" approach, to get women now hooked on artificial feeding to switch to

breastfeeding with their subsequent infants. A variety of tactics need to be tried, and each must be appropriate to local conditions. Research on the determinants of changing infant feeding practices should assist policy makers in this regard (Laukaran et al., 1981).

7. Conclusion

Lactation is not by any means a certain means of preventing conception. The various studies discussed here do, however, provide excellent evidence that breastfeeding has an effect in delaying the onset of menses and of ovulation post-partum. Through this mechanism, and also aided in some societies by intercourse abstention during lactation, breastfeeding will delay pregnancy in a significant number of cases. Data suggest that in developing countries where long and fairly full lactation is common, this practice may result in an increased interval of 6 to 12 months between successive births. In these circumstances breastfeeding would be preventing 15 to 40% of the births that would be expected to occur if bottle or other feeding practices were the usual practice. An extrapolation of this to birth rates of the low income countries where breastfeeding is still the rule but is losing ground, makes the mind boggle. This fact deserves much more serious consideration than has thus far been given to it. Lactation practices as they exist today are having a very important effect on limiting population growth, and in ensuring smaller family sizes.

Besides this advantage, breastfeeding is very important for the nutrition and health of the infant, and the accepted alternative is usually cripplingly expensive for poor families and low income countries. Economists and development planners need to be made aware of this and should give high priority to programs designed to prevent a change from breast to bottle-feeding.

8. Acknowledgements

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That paper which was not published, has greatly helped in the writing of the present article. I remain extremely grateful for the contribution made by Ms. Noellsch, Dr. Stephenson and Dr. Harrington.

Note: This paper has not reviewed the literature relating to the possible effects that different contraceptive methods might have on human lactation nor the advice that should be given to mothers in relation to contraceptive choices for lactating women. These issues have recently been reviewed by V. J. Hull ("The effects of hormonal contraceptives on lactation: current findings, methodological considerations and

future priorities") and by V. H. Laukaran ("Contraceptive choices for lactating women: suggestions for post-partum family planning") and published in Studies in Family Planning, Volume 12, April 1981.

9. References

- Baxi, P. G. A natural history of childbearing in the hospital class of women in Bombay. *Journal of Obstetrics and Gynaecology of India* 8: 26-51 (1957).
- Bleek, W. Spacing of children, sexual abstinence and breastfeeding in rural Ghana. *Soc. Sci. and Med.* 10: 225-230 (1976).
- Bongaarts, J. Does malnutrition affect fecundity: a summary of the evidence. *Science* 208: 564-569 (1980).
- Chen, L. C., Ahmed, S., Gesche, M. and Mosley, W. H. A prospective study of birth interval dynamics in rural Bangladesh. *Population Studies* 28(2): 277-297 (1974).
- Cronin, T. J. Influence of lactation upon ovulation. *Lancet* 2: 422-424 (1968).
- Das, S. K. and Mitra, A. K. A clinico-pathological study of lactational amenorrhea. *Journal of Obstetrics and Gynaecology of India* 16: 153-163 (1966).
- Davis, M. E. Comment. *Am. J. Obstet. and Gynec.* 59: 851 (1950).
- Delvoye, P., Delogne-Desnoeck, J., and Robyn, C. The influence of the frequency of nursing and of previous lactation experience on serum prolactin in lactating mothers. *J. Biosocial Science* 9: 447-451 (1977).
- Frisch, R. E. and McArthur, J. W. Menstrual cycles: fatness as a determinant of minimum weight for height necessary for their maintenance or onset. *Science* 185: 949-951 (1974).
- Gautier, E. and Henry, L. La population de Crulai, paroisse Normande. (Presses Universitaire, Paris, 1958).
- Giolosa, R. Incidence of pregnancy during lactation in 500 cases. *Am. J. Obstet. and Gynec.* 70: 162-174 (1965).
- Goody, J. The social organisation of the Lowill. 2nd Edition. (Oxford University Press, London, 1967).
- Greiner, T., Almroth, S. and Latham, M. C. The economic value of breastfeeding. Cornell International Nutrition Monograph Series, No. 6 (Cornell University, 1979).

- Habicht, J. P., Butz, W. P., Meyers, L. D. and DaVanzo, J. Can influences on hormonal secretion be inferred from retrospective surveys of breastfeeding and postpartum amenorrhea. Paper presented at the annual meeting of Population Association of America (1981).
- Henripin, J. La fécondité des ménages canadiens au début du XVIII^e siècle. Population 61-84, Jan.-March (1960).
- Huffman, S. L., Chowdhury, A. K. M. A., Chakra-Borty, I. and Simpson, N. Breastfeeding practices in rural Bangladesh. Amer. J. Clin. Nutr. 33: 144-154 (1980).
- Huntington, G. E. and Hostetler, J. A. A note on nursing practices in an American Isolate with a high birth rate. Population Studies 19: 321-324 (1966).
- Jelliffe, D. B. Infant nutrition in sub-tropics and tropics. W.H.O. Monograph No. 29 (W.H.O., Geneva, 1968).
- Jelliffe, D. B. and Jelliffe, E. F. P. (Editors) The uniqueness of human milk. Symposium. Amer. J. Clin. Nutr. 24: 967-1024 (1971).
- Jelliffe, D. B. and Jelliffe, E. F. P. Human milk in the modern world. (Oxford: Oxford University Press, 1978).
- Kamal, I., Hefnawi, F., Ghonheim, M., Talaat, M., Younis, N., Tagul, A. and Abdalla, M. Lactation pattern of Egyptian women. Am. J. Obstet. Gynec. 105: 314-323 (1969).
- Kippley, S. K. and Kippley, J. F. The relation between breastfeeding and amenorrhea: report of a survey. Journal of Obstet. and Gynec. and Neonatal Nursing 1(4): 15-21 (1972).
- Knodel, J. Breastfeeding and population growth. Science 198: 1111-1115 (1977).
- Knodel, J. and van de Walle, E. Breastfeeding, fertility and infant mortality. Population Studies 21(2): 109-131 (1967).
- Knutson, K. E. and Mellbin, T. Breastfeeding habits and cultural context. J. Trop. Pediat. 15: 48-55 (1969).
- Konner, M. and Worthman, C. Nursing frequency, gonadal function and birth spacing among Kung hunter-gatherers. Science 207: 788-791 (1980).
- Kuzrok, R., Lass, M. P. and Smelser, J. Studies related to time of human ovulation. J. Proc. Soc. Exper. Biol. and Med. 36: 356-359 (1937).
- Lass, P. M., Smelser, J. and Kuzrok, R. Studies relating to time of human ovulation. Endocrinology 23: 39-43 (1938).

- Latham, M. C. Maternal nutrition in East Africa. *J. Trop. Med. and Hygiene* 67: 90-92 (1964).
- Latham, M. C. In: Human Nutrition in Tropical Africa. 1st Edition. (F.A.O., Rome, 1965).
- Latham, M. C. Increasing production and consumption of dairy products and eggs in developing countries. In Proceedings of the VII International Congress of Nutrition, Hamburg 1966. 3: 61-75 (1967).
- Latham, M. C. Infant feeding in national and international perspective: an examination of the decline in human lactation and the modern crisis in infant and young child feeding practices. *Annals N. Y. Acad. Sci.* 300: 197-209 (1977).
- Latham, M. C. Human Nutrition in Tropical Africa. 2nd Edition. (F.A.O., Rome, 1979).
- Laukaran, V. H., Kellner, E. K., Winikoff, B., Solimano, G., Latham, M., Van Esterik, P. and Post, J. Research on determinants of infant feeding practices: a conceptual framework. Population Council International Programs Working Paper No. 15. Population Council, New York (1981).
- Lunn, P. G., Prentice, A. M., Austin, S. and Whitehead, R. G. Influence of maternal diet on plasma prolactin levels during lactation. *Lancet* 1: 623-625 (1980).
- McKigney, J. Economic aspects of lactation. *Am. J. Clin. Nutr.* 24: 1005-1012 (1971).
- Morley, D. From mimeograph of transcript for slide series entitled: Breastfeeding. (1967).
- Noel, G. L., Suk, M. K. and Frantz, A. G. Prolactin release during nursing and breast stimulation in postpartum and non-postpartum subjects. *J. Clin. Endocr. and Metab.* 38: 413-423 (1974).
- Osbay, F. Personal communication (1971).
- Peckham, D. H. *Bull. Johns Hopkins Hosp.* 54: 186-191 (1934).
- Perez, A., Vela, P., Masnick, G. S. and Potter, R. G. First ovulation after childbirth: the effect of breastfeeding. *Amer. J. Obstet. and Gynec.* 114: 1041-1047 (1972).
- Perez, A., Vela, P., Potter, R. G. and Masnick, G. S. Timing and sequence of resuming ovulation and menstruation after childbirth. *Population Studies* 25, No. 3: 491-503 (1971).
- Peters, H., Israel, S. and Purshottam, S. Lactation period in Indian women. *Fertility and Sterility* 9: 134-144 (1958).

- Pool, D. I. The rural-urban fertility differential in Ghana. I.U.S.P. General Conference, London (1969).
- Potter, R. G., New, M. L., Wyon, J. B. and Gordon, J. E. In: Public Health and Population Change, Editors, Sheps, M. C. and Ridley, J. C. (University of Pittsburgh, 1965).
- Prema, K. Lactation and fertility. Am. J. Clin. Nutr. 32: 1298-1303 (1979).
- Rice, F. W. The function of lactation in the Family Today, 96-100. Washington, D. C. (1944).
- Rosa, F. W. An estimate of fertility protection from breastfeeding in developing countries. U.N.F.P.A., New York (1974).
- Salber, E. J., Feinleib, M. and MacMahon, B. The duration of postpartum amenorrhea. Amer. J. of Epidem. 82: 347-358 (1966).
- Schallenberger, E. and Knobil, E. Suppression of prolactin secretion and the amenorrhea of lactation in the rhesus monkey. Procs. of 62nd Annual Meeting of the Endocrine Society, 18-20 June. Washington, D. C. (1980).
- Sharman, A. Menstruation after childbirth. Journal of Obstetrics and Gynaecology of the British Empire 58: 440-445 (1951).
- Sheps, M. C. An analysis of reproductive patterns in an American Isolate. Population Studies 19: 65-79 (1965).
- Simpson-Hebert, M. and Huffman, S. L. The contraceptive effect of breastfeeding. Studies in Family Planning 12: 125-133 (1981).
- Smith, T. E. The Cocos-Feeling Islands: a demographic laboratory. Population Studies 14(2): 94 (1960).
- Tietze, C. The effect of breastfeeding on the rate of conception. International Union for Scientific Study of Population, International Population Conference. Vol. II, New York, 129-137 (1961).
- Topkins, P. The histologic appearance of the Endometrium during lactation amenorrhea and its relationship to ovarian function. Am. J. Obstet. and Gynec. 45: 48-58 (1943).
- Udesky, I. C. Ovulation in lactating women. Am. J. Obstet. and Gynec. 59: 843-848 (1950).
- van Ginniken, J. The chance of conception during lactation. J. of Biosocial Sciences. Supplem. No. 4: 41-54 (1977).
- W.H.O. Final report on pilot studies in family planning. W.H.O. Regional Office for S.E. Asia, New Delhi (1954).

W.H.O. Contemporary patterns of breastfeeding: report on the W.H.O. Collaborative Study on Breastfeeding. (Geneva, W.H.O. 1981).

Wyon, J. B. and Gordon, J. E. The Khanna study: population problems in the rural Punjab. (Harvard University Press, Cambridge, Mass. 1971).

II. Appropriate Strategies to Improve Infant and Young Child Feeding

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1. Introduction

One of the main distinguishing features of the class of animals known as mammals is the possession of mammary glands or breasts by the female of the species by which she continues the nurturing of her offspring which began in the uterus. Throughout the ages, human beings have considered breastfeeding the only natural nourishment for the infant. The nursing mother of ancient Rome had her own special goddess, Rumilia, to whom she prayed and the mother goddess of ancient Babylon, Ishar, was depicted as suckling a baby. Even Confucius (551-478 B.C.), the sage of China, taught that mothers must nurse their babies for at least three years. One might thus regard the controversy concerning breast versus artificial feeding of infants as relatively recent but closer examination of the history of infant feeding reveals another story.

The use of substitute foods, such as cow's milk, and wet nurses, usually slaves or lower class women, dates back to the earliest historical times. In Homeric Greece (950 B.C.) wet nurses were in frequent demand and their popularity increased in the beginning of the Christian era among the wealthy women of Athens and Rome. The situation became so much in vogue that Emperor Antonius Pius (138 A.D.) of Rome issued premiums for mothers who nursed their own babies (Hymanson, 1934).

Feeding bottles have been discovered in excavations from France dating back to 2000 B.C. and in the Nile Basin dated at approximately 500 B.C. (Wickes, 1953). A large number of clay vessels have been excavated from the graves of Roman infants who died between the first and the fifth century A.D. (Hymanson, 1934). The first mention of the use of a perforated cow's horn as a baby feeder occurs in The Talmud in the 3rd century but it wasn't until the Middle Ages that its use became widespread amongst the peasant classes as depicted in medieval prints. Simon de Vallambert in his treatise on infant feeding, 1565, recommended the feeding of cow's or goat's milk through a horn after the third month of life (Wickes, 1953).

The eighteenth century saw the increased popularity of the use of animal milks for infant feeding and in France "direct suckling" from the udder of a goat became common practice. This method lost favor rather rapidly as the laity of Europe "objected to the odor of goat's milk and found it inconvenient to accommodate a goat in the home" (Hymanson, 1934). This century also heralded the elaboration of feeding bottles with the manufacture of boat-shaped vessels made of china and pewter feeding pots with metal nipples. Glass bottles were first used in the 19th century with teats made of chamois leather or linen. The first rubber nipples were introduced in 1856 and have been popular ever since (Wickes, 1953).

Before the 19th century, the only alternatives to breast milk were either animal milks, with or without some modification, or some form of starchy gruel made with flour or bread (Jelliffe, 1955). The first step toward dehydrated milks was made by Newton in 1835, who patented a process for slowly concentrating sweetened cow's milk. Nestles produced the first condensed milk in "tin boxes" in 1866, soon followed by several other firms (Wickes, 1953). The use of roller and spray processes for drying milk became popular in the late 1800's and with it the development of patent infant foods so that by 1883 there were no less than 27 brands (Wickes, 1953).

Parallel to the increased use of artificial foods for infants ran the increase in infant mortality. In Britain in 1660, the ratio of mortality of breastfed infants to those who were "dry-nursed" was 19.2 : 53.9 percent. Artificial feeding resulted in an 80% infant mortality rate in Paris in 1777 and a rate of 59-82% in 19th century Berlin where the rate was only 9% among breast-fed infants (Hymanson, 1934).

Obviously, the problems encountered in many Third World nations today stemming from an increased use of artificial infant foods are not as recent as supposed but date back to earliest recorded history as witnessed by the number of Roman infants who were buried with their "bottles." Some may postulate that this is an inevitable effect of urbanization but we would hope otherwise, and that history may teach us certain valuable lessons.

The General Problem

Child feeding is directly related to child nutrition, so an improvement in child nutrition is needed when diets are deficient. If we look at today's world, we can find societies where a majority of the children are well nourished and others where an important segment of the child population are undernourished or malnourished. The most common deficiency disease is protein-energy malnutrition (PEM).

There is a direct relationship between the nutritional status of a given society and its degree of development. In the majority of the western industrialized countries and in the majority of the more advanced socialist countries, PEM is no longer a problem that is affecting a large proportion of the young population.

On the other hand, in the majority of third world countries, millions of children have deficient diets. As a consequence PEM is one of the most important social problems that these societies face. Often the prevalence of PEM in a given society is related to the degree of development. PEM in general terms is related to political, economic and social factors. In developing countries, due to the low purchasing power of most individuals and families, there is a lack of food, either in quantity and/or quality. As a consequence, the diet is poor and as a result malnutrition is prevalent.

The only way to defeat malnutrition as a social problem in developing countries is to "develop." But for that, it is necessary that important political and economic changes occur, and those changes are not dependent only on nutrition policy or nutrition programs. Nutrition as a general problem cannot be resolved without political, economic, and social transformations. In the developing countries it is possible for nutritionists to collaborate in resolving some of the problems resulting from underdeveloped status.

The Specific Problem

Although PEM is the most important form of malnutrition in developing countries, it is not the only one. Anemia, xerophthalmia, pellagra, beriberi, etc. are other diseases often related to the economic situation in a society. But some programs in some countries have proved effective in resolving some of these problems such as xerophthalmia and goiter, through fortification of popular and inexpensive products and without changes in the political, economic or social factors in the country. Thus, if today it is impossible for nutritionists to eliminate malnutrition, it is feasible for them to alleviate some of its problems.

Protein Energy Malnutrition (PEM) is often precipitated by gastroenteritis and diarrhea which in turn may result from the inappropriate use of bottle feeding. This Western technology is used to complement or substitute for breastfeeding in an increasing proportion of the low income populations in developing countries. The trend towards bottle feeding has been most marked in the urban populations. But increasingly this practice is spreading to the rural areas where the dangers of inappropriate bottle feeding may be even greater than in the cities.

A major concern is the increase in malnutrition among infants and young children of low income populations due to the inappropriate use of bottle feeding. By reducing the prevalence of bottle feeding and by increasing the use of breastfeeding, the whole nutrition problem will not be resolved unless other measures are also taken, but at least it will have some impact in reducing infant morbidity and mortality.

Breast milk is the best food by far for the infant. It is desirable that the mother receives a balanced diet during pregnancy and lactation (PAG, 1971). But even poorly nourished mothers can successfully breastfeed their infants (Williams et al., 1977). The mother's diet will effect mainly the fat and vitamin content, particularly vitamin C, riboflavin and thiamin, of her milk. It is only the severely malnourished

mother who will cease lactation completely. In such a case, supplementation by artificial feeding or a wet nurse is required. Very few women are physically incapable of producing milk (estimated at 5% of the population by Deem (Deem, 1958) and less than 1% by Worthington (Williams, 1977)). Therefore, the situation that nutritionists face is an increasing incidence of women from low income families who are capable of providing an adequate quantity and quality of breast milk for their babies but who chose to adopt an artificial means of feeding instead.

The problem is that the living conditions and the economic level of low income families in many countries precludes the proper use of infant formulas. Often there is little appreciation of the financial and sanitation conditions required for safe preparation, feeding and storage of breast milk substitutes. Environmental conditions in developing countries are particularly conducive to infection. A clean water supply often is not available for mixing with the formula or for washing purposes. Any leftover formula may remain in the bottle and the warm environment is conducive for the growth of microorganisms, thus increasing the likelihood of infection of the infant.

Directions for measuring and mixing the formula may not be understood. They may be written in English (Leonard, 1977) for mothers who cannot read English. Once the initial supply of powder is finished (which might have been a free sample) the next tin is purchased and its contents are often stretched because the purchase price is such a great burden on the family income. A result of all of these factors may be a dilute and contaminated source of nutrients which may lead to malnutrition and gastro-enteritis and diarrhea. This latter condition is often treated by withdrawal of food. Diarrhea may result in a decrease in the absorption of nutrients from the intestine. Infections may lead to an increased nitrogen loss (Latham, 1975) which must be recovered if growth is to occur...and the infant may become severely malnourished if the cycle is allowed to continue. In the meantime, the mother may have ceased milk production which is difficult if not impossible to regain (Williams et al., 1977).

The Advantages of Breastfeeding

There is an increasing body of evidence in support of breastfeeding over bottle feeding even under the most ideal conditions. It is well documented that intestinal infections are less common in breastfed than in bottle fed infants. This is due largely to the contamination that occurs with bottle feeding and the anti-infection properties of breast milk. Breast milk, and colostrum in particular, contains antimicrobial factors (antibodies, lymphocytes, macrophages, anti-viral and other agents) and while these do not supply complete protection against infection, they play a large part in compensating for the "immature" immunological system of the newborn infant. Studies have demonstrated the protective effect against enteropathogenic E. coli, Salmonella and Shigella. There is evidence supporting the theory that IgA, which is found in breast milk at levels much greater than those appearing in the maternal serum, has a selective effect on E. coli, rendering the intestinal population less virulent. A fairly consistent level of intake of

IgA E. coli antibodies is thought to be consumed over the first months and breastfeeding is recommended for this reason even if the levels of milk produced are low (Gothefors et al., 1976).

There appears to be an association between allergic disorders and artificial feeding. The basis for this is the high permeability of the gut (during the neonatal period) to large molecules such as proteins. Cow's milk protein may be allergenic and can lead to the sensitization of the infant's immune system. IgA may help eliminate foreign proteins in the gut and in this way decrease the likelihood of foreign proteins entering the system and allergic responses developing. With time, the permeability decreases; the exception may be during periods of diarrhea (Gothefors et al., 1976).

In addition to the immunological factors affecting the gut flora, the high lactose content (when compared with that found in cow's milk) of breast milk promotes growth of acid producing microorganisms. It is thought that the resulting acidic environment checks the growth of the undesirable bacteria in the infant's gut and improves the absorption of certain minerals and metals (Williams et al., 1977). The iron in breast milk is better absorbed than that found in formulas. There are also lipases present in breast milk that aid in the absorption of fats.

In summary, human breast milk contains nutrients in an appropriate balance for proper human growth as well as a variety of substances which help protect against infections. Breast milk is an economically efficient, relatively uncontaminated nutrient source especially designed for the human infant.

Lactation initiation and maintenance is a neuroendocrine process. The milk ejection reflex is sensitive to levels of oxytocin, a pituitary hormone that is not released when the mother is under stress or psychologically disturbed. It is secreted in response to the infant's cry. Suckling is the stimulus which maintains adequate lactation. The greater the frequency of the suckling, the greater the production of milk. Self-demand fed infants are found to gain more weight than those on a 3-4 times/day feeding schedule (Williams et al., 1977). Both of these factors are important to remember when "insufficient milk" is given as a reason for adoption of bottle feeding. Hospital routines may not be in step with the physiology of lactation.

There are certain other benefits derived from breastfeeding. Lactational infertility is neurogenically and hormonally based. The inconsistencies in lactation's ability to prolong the infertility period beyond 48 days are based on the frequency, duration and intensity of the nursing stimulus (Tyson, 1977). Because a warning menstruation does not always precede ovulation, it is not recommended as a birth control method. From the public health point of view however, lactation's effect on the birth interval can be substantial. A 5-20% increase in birth interval as a result of breastfeeding is thought to be average, however a 15-month increase has been reported (Van Ginneken, 1977), but malnutrition was mentioned as an associated factor in this figure. This increase in birth spacing allows greater time for the mother to regain her nutrient

stores prior to the next pregnancy and the infant is "the baby" (with all the attention associated with the position) for a longer period of time. This will probably result in better health both mentally and physically.

There may be other psychologically based benefits to the infant who is breastfed. The protective instincts of the mother towards her children have been shown to be greater towards the breastfed child. This supposedly increases the attention received to the overall benefit of the infant. Breastfeeding is also suggested to promote a more relaxed attitude in the adult (Hugh, 1975). However in this study the sample size was very small and there are conflicting views on the point. The temperament of the mother and not the method of feeding could be the source of the differences. It is also possible that temperament could also be the reason behind selecting one method of feeding over another.

But what are some of the factors involved in a decision concerning the method of feeding an infant. Speaking of the evolution of bottle feeding in the industrialized countries, Carballo gave some interesting suggestions. He sees the extended family as becoming nuclearized; the education and the emotional support from the grandmother or mother who had experience with breastfeeding may no longer be close at hand. But advertising was and that became the informational source. Family size decreased and a young child was less likely to see a sibling being breastfed but was likely to view bottle feeding on television. Support from industry that would allow women to work and still be able to breastfeed their children was absent. If a woman wanted to go to work, the infant would have to be bottle fed. It was more convenient, allowed the mother more mobility. Embarrassment and fear were also involved; the breast had become a sex symbol. And there was the medical profession --a hospital routine that separated the mother and infant for hygienic reasons. In response to the figure of 30% of all the staff concerned with maternal and child health in a particular district agreeing with the proposition that breastfeeding is no longer an important issue, Ursula Liebrich wrote:

"This should make us reflect a little. Most of us who have been through medical school have had the experience of hearing nothing about breast feeding, although we have heard about formulae and how to miss them. The doctor's role is supposed to be health care, but in fact his training is for disease care. Therefore, a normal phenomenon such as breast feeding does not come much into the curriculum.

We have exported our health services all over the world --despite the fact that they may not be appropriate to other societies--and with the exporting of our health services have gone many of our attitudes too. The trend to separate mother and baby has gone on for centuries, in European societies. No other society has used things like a pram, or developed a fashion which makes it almost impossible for a mother to feed her baby,

yet these things can be found in our society for several centuries. Wet nurses for instance are a European invention. They preceded the baby food industry which in fact grew out of this concern of our society to get women away from their babies. The breast has been looked upon in our society as an erotic symbol for men to play with not for babies to feed from. This is one of the fundamental changes we ought to try to make in attitudes."

During a study of infant feeding practices in Kingston, Jamaica, women were questioned in the hospital maternity ward as to why they chose to bottle feed. Thirty-three percent of the 300 women interviewed said it was because they had insufficient milk. When questioned further, this was found to be an excuse (the actual reason for bottle feeding was not relayed in the paper), 13% said it was because of work, 15% were automatically complemented with bottle for no good reason, and 14% said it was because they had been told to by a nurse employed by a formula company, or a free sample had been given to them. In the discussion at the end of the paper, the author wrote that the commercial milk nurses waited outside the postnatal clinics with free samples (Grantham-McGregor, 1970). One can appreciate how the person to person promotional strategy of this kind and performed at the particular point in time when a woman would be most receptive to "facts" about the benefits of bottle feeding for her new child, could produce such results. Especially if the hospital staff is overworked and not aware of the dangers of inappropriate bottle feeding. Besides who would want to lecture on such a "mundane thing" as breastfeeding when there are formulas to mix and bottles to wash. That's probably exactly what the 33% of women who said they had insufficient milk were wishing they could be doing. And sure enough, a commercial milk nurse was often nearby. This is one of the points where preventive measures would be effective.

2. The Economics of Breastfeeding: the National and the Individual Level

The National Level: How the multinational corporations gained a foothold in the markets (Latin America).

During the immediate post-war period emerged the growing use of international credit agencies as financial intermediaries for national governments as a part of international economic affairs (Furtado, 1976). In Latin America, industrial development has called for the assimilation of modern technology which has to be largely imported. In order to reduce the import coefficient (ratio of imports to domestic product, i.e. all that a country imports divided by all that it produced internally) a country must have a more than proportional growth of the industrial sector (to compensate for imports of industrial equipment). As a result, developing countries in Latin America designed policies to provide special inducements to attract foreign capital to the manufacturing sector. The countries had to promote industrial development at a faster rate, so they needed capital and technology from the multinational corporations.

At a further stage, however, the industrial development of Latin America meant a loss of markets for the international groups that had formerly supplied them. Such groups could safeguard their markets only by decentralizing part of their economic activity, setting up Latin American subsidiaries to operate locally.

Two different factors thus converged: the desire of countries in Latin America to reduce their import coefficient (by rapid industrialization) and the concern of international groups to safeguard their traditional position in the markets of these countries.

The multinational corporations now controlled products that had become familiar in the local markets and could more easily mobilize technical resources and foreign and domestic credit.

"Too often companies have taken undue advantage of cheap raw materials, cheap labor and various tax havens in order to maximize profits. Accounting rigged to send profits to company affiliates in countries with little or no taxation, and price manipulation are among the abuses." (Simon, 1975, 103-4)

Multinationals occupied privileged positions in the markets where there was a wave of import substitution. Moreover, foreign enterprises could nearly always count on the exceptional facilities extended by Latin American governments. Often the government was providing resources free of charge for the enterprise to establish itself in the country.

Two main consequences resulted from these policies with adverse effects on the economic resources of developing countries. Since most of the milk used in manufactured formula products must be imported, this drains domestic capital and helps create a substantial deficit in the balance of payments. For example, the Ivory Coast spent almost 10 million dollars for imported dry milk almost exclusively for infant formula products from 1970-72 (Greiner, 1975). It has been estimated that if 20% of mothers in developing countries do not breastfeed, the loss in breast milk is 365 million dollars (Berg, 1973).

Another costly result of increasing bottle feeding practices is the economic burden from increasing prevalence of infant malnutrition (PEM). Public health and nutritional interventions, (e.g. mothercraft centers and supplementary feeding programs) are expensive and never enough to eradicate this problem. In both of the above there is a misallocation of economic resources that could be used for development purposes.

The Female Labor Force and Breastfeeding.

Many different reasons for the decline in breastfeeding have been given, among them is an increase of mothers entering the paid labor force away from home, thus not having the time or facilities to breastfeed. One of the major infant formula distributors in the Third World, Nestles, states "the preponderance of available evidence points to a

mother's need or desire to work, as the principal reason for the breast feeding decline" (Latham, 1978). However, current literature and studies tend to refute this claim. In the words of Alan Berg, the abandonment of breastfeeding "is primarily an urban phenomenon, often not so much because urban mothers work as because bottle feeding is one of the sophistications of city life the urban migrant adopts" (Berg, 1973).

In her thesis, "Breast Feeding Practices in a Rural Area in Jamaica," E. S. Almroth studied such factors as how old the baby was when the mother began work, how far from home she worked and the type of work performed by the mother. She also reviewed the literature to find the extent to which women entering the paid work force was a factor in the decline in breastfeeding. Her results showed that going out to work constituted only a small percentage of commonly given reasons for weaning and work for the majority of mothers was not a factor preventing unsupplemented breastfeeding for the first few months. For 40% of the mothers interviewed, distance to work would not interfere with breastfeeding. Also, since few mothers started work before the baby was 6 months old, work need not be the reason for early supplementation (Almroth, 1976).

M. C. Latham, as quoted in recent literature, argues against the need or desire for a mother to work as a factor in the decline in breastfeeding. He states that studies from 5 countries in Asia, Latin America, Africa and the Caribbean suggest "that no more than 6 percent of mothers in any country said they gave up breastfeeding in order to work" (Latham, 1978).

Research in Ghana by T. H. Greiner provided the opportunity to study the relationship between breastfeeding and women's participation in the labor force. In 1960, the percentages of women working in agriculture and as traders were 37% and 80%, respectively. In the 10 years up to 1970, the percentage of women who were homemakers fell from 36.7% to 26.1%. Yet, Almroth in 1977 found very little decline in weaning age in urban areas in Ghana. However, during that 10-year period, there seemed to be a significant increase in supplementation of breast milk with formula, milk and flavored drinks at an earlier age (Greiner, 1977).

Ghana provides a good example of the compatibility of breastfeeding and employment. The 1967 Labour Decree Part V (ILO: Legislative Series, 1967 Ghana 1), stipulates that the employer of any industrial, commercial or agricultural undertaking "...shall give leave to any pregnant female worker... and allow her ... if she is nursing a child, half-an-hour twice a day during her working hours for this purpose" (International Labour Review, p. 126). Some mothers actually may combine their two "breaks" and leave work an hour early in order to return home to breast-feed in the evening. Other mothers find ways to adapt their breastfeeding routine to their employment schedules.

The People's Republic of China provides another example of how working mothers are able to continue breastfeeding their children. In the PRC, facilities at the job site are provided for nursing mothers. J. D. Wray writes "in factories and other work facilities creches are provided, with an abundance of older women as caretakers." Mothers are given nursing-

breaks and are expected to breastfeed their infants. In urban areas this continues for up to 9 months and sometimes up to 12 months. On communes in the rural areas, where 80% of the population lives, the working schedules of mothers are adjusted so they can return home to breastfeed their infants (Wray, 1976).

Thus, contrary to the notion of Nestles, the need for the mother to work does not appear to be a principal reason for the present decline in breastfeeding. Nevertheless, there do exist the working women who find it incompatible with their jobs to continue breastfeeding. For the urban mother, some strategies to preserve breastfeeding in the female labor force would include such institutional changes as providing day care centers, flexible working hours and creches for infants of nursing mothers. These steps by employers would also provide positive benefits for women including shorter pregnancy leaves and enhanced employment opportunities. In a local Ghana periodical, The Home Scientist (1973), basic suggestions on how to provide a rural mother with more time and energy to breastfeed her child were made. Simple village machines and mills to reduce labor-time, improved nearby water supplies, easier methods of cooking and processing foods, improved farming methods and even increasing the use of bicycles would all lessen the work load of the rural mother and provide her with more time and energy to care for her child.

The Individual Level:

The Working Mother

The fact that women need to obtain paid employment away from home is often stated to be an important reason why women abandon breastfeeding in favor of bottle feeding. An economic analysis of breastfeeding may be done from the viewpoint of the increased participation of women in the labor force as one of the most important factors affecting breastfeeding practices (Reutlinger and Selowsky, 1976).

The effect of lactating mothers participating in the labor force could be viewed as a problem of "negative income effect." This means that unless the additional income earned by the mother is enough (and used for this purpose) to feed adequately the infant, the effect of this additional income may have a negative impact on the infant's nutritional status. The way to quantify this relationship (additional income vs. infant feeding) may be done by using the following equation:

$$M_c = \alpha M_b$$

where M_c = quantity of cow's milk

$$P_c M_c = M \Delta y$$

M_b = quantity of breast milk

$$M = \frac{P_c \cdot \alpha \cdot M_b}{\Delta y}$$

α = conversion factor

P_c = price of cow's milk

M is the proportion of the additional income (Δy) to be spent on milk--this is called by economists the Required Marginal Propensity to Spend on Milk.

Required Marginal Propensity to Spend on Milk
to Maintain Nutritional Status of Children, Calcutta

Item	Infants' ages (months)				
	0-6	7-12	13-18	19-24	0-24
1. Monthly potential breast milk (liters)	25.9	15.2	15.2	6.1	15.6
2. Cow milk equivalent (liters)	30.5	17.5	17.5	7.0	18.2
3. Cost of milk equivalent (rupees)	91.5	52.5	52.5	21.0	54.6
4. 70 percent of row 3, above	64.0	36.7	36.7	14.7	38.2
5. Monthly income of unskilled woman, 1973 (rupees)	120	120	120	120	120
6. Required marginal propensity to spend on milk	0.53	0.30	0.30	0.12	0.32

Sources: Rows 1 and 2, Alan Berg, The Nutrition Factor: Its Role in National Development (Cambridge, Mass.: M.I.T. Press, 1973); Row 3, using a price of 3 rupees a liter (price as of October 1972 in Bombay and Madras); Row 5, corresponds approximately to the monthly wage of a woman in domestic service in a large urban area.

From the above table, one may observe that in Calcutta, India, a working mother must spend more than one-half her salary, i.e. the family's additional income (Δy) just to adequately feed her child of 0-6 months with formula milk. When the child is 7-18 months, she still spends one-third of her earnings for formula. After 18 months, this proportion falls to 12% because of the need to complement the child's diet with solid foods.

The above analysis has some important implications. First, by the time the percent of the mother's income spent on milk falls to its lowest level, her child may already have PEM. Note that during the first two years of life, the proportion that a working mother should spend on milk equals one-third of her earnings, i.e. one-third of the family's additional income. Secondly, this proportion is related to one child only. It is frequently observed that poor families have successive births of children sometimes with a spacing of one year or less. That means that a mother could have two children considered during the 24 months of this analysis.

This brings the percentage of her earnings spent on child feeding up to 80%. Thirdly, it should be noted that very probably, the mother works to increase the family's low earnings. The additional income provided by her work has to be allocated to help pay a whole range of expenses

(housing, food, clothing, etc.). It is very unlikely that she would spend one-third of the family's additional income to bottle feed her youngest child. The milk formula the family buys is, as a result, often diluted to make it last as long as possible. Overdilution may be the cause of PEM as discussed elsewhere.

Whether a woman works or not, the one obvious economic advantage to breastfeeding her baby is that the minimum food costs to support lactation will practically always be lower than the minimum costs of artificial feeding (McKigney, 1971). Over a period of six months or longer, the cumulative economic advantage of breastfeeding is significant, particularly for a family with an extremely limited income (McKigney, 1971). Energy in human milk is produced with an efficiency of 90% (Thompson, 1970). This means that for a woman producing 500-600 kcal/day in milk, and extra 600-700 kcal/day as dietary energy should be adequate to support lactation (Thompson, 1970). During the period of lactation, a woman has increased needs for dietary protein as well as for other nutrients, but her energy needs at least should be easily supplied from a mixture of local dietary staples.

Some indirect outcomes of breastfeeding may also have distinct economic advantages. One important consideration is what effect breastfeeding has upon the health of the infant. It is well known that human colostrum and milk contain anti-infective properties that help protect a nursing baby from infections during the first months of life. Assuming that a bottlefed baby has more frequent bouts of illness; and that these illnesses are more severe than its breastfed counterpart, what are the economic consequences to his/her family? If he is the infant of a well-to-do family, it is unlikely the baby's sickness will cause an economic "crisis" within the family. However, for a Third World family living in poverty, the results may well be devastating. It may require the mother and/or the baby's father to lose time from work. Transportation to a health clinic, doctor's office or hospital may be very expensive to say nothing about the cost of medical care and of medicines.

Another indirect advantage that breastfeeding has compared to bottle feeding of infants is its role as a contraceptive. Rather recent studies have supported the traditional belief in many countries that breastfeeding has a contraceptive effect and delays the onset of pregnancy (Jelliffe and Jelliffe, 1972). Ovulation and menstruation are delayed for at least ten weeks and perhaps up to 26 weeks if breastfeeding is complete, successful and unrestricted. This contraceptive effect is attributed to prolactin and other lactogenic hormones as a result of the sucking stimulus from the nursing infant. In areas of high fertility, it has been estimated that lactation may prevent as much as 20% of expected births and cause an overall delay in pregnancy of 15 months (Jelliffe and Jelliffe, 1972).

One advantage that is often cited for breastfeeding is its convenience. This is true also for mothers in developing countries. For mothers in developing countries, the cost of bottle feeding in terms of time is very great indeed. They often must walk long distances over rough terrain to obtain water and firewood. The firewood (or other cooking fuel) may

be very scarce and therefore expensive. In fact, the mother's time may be the most important parameter to consider in the breast vs. bottle feeding controversy.

3. The Promotion of Infant Formula

It is apparent that bottle feeding of infants has become prevalent in many areas of the underdeveloped world. The rapid decline in rates of breastfeeding is alarming. In Chile, for example, breastfeeding dropped from a rate of 90% in 1960 to less than 10% in 1968 (Berg, 1973). Mexico suffered a decline in breastfeeding from 95% to 40% in only a six-year period (ibid.). This trend cannot be understood as a beneficial effect of modernization and urbanization, for poverty conditions have not improved for the majority of the world's poor. It appears therefore that bottle feeding is influenced by factors unrelated to positive rising standards of living, and is rather the result of dangerously inappropriate social and cultural shifts. In this section we will focus on how promotional strategies of infant formula companies underlie or contribute heavily to the adoption of artificial feeding.

Advertising through the media has been the most visible aspect of company promotional activities. Advertisements in popular magazines, newspapers, radio, and on television, and poster displays have been directed towards the general public. A survey of worldwide publications by Ted Greiner disclosed a tendency for ads to be placed selectively in low-income publications (Greiner, 1975). It is lower-income groups which represent untapped markets, and broad-based media advertising may serve to support and back up the more direct efforts at reaching target groups in clinics and hospitals, and through home-visitation (ibid.).

Media advertisements help to create a positive attitude towards the marketed product. There is a heavy reliance on emotional appeal; the healthy "champion baby" adorns many ads and product labels (ibid.). "Many imported foods," notes Greiner, "stress their origin from a developed country." Such approaches seek to establish and re-affirm the connection between the high social status of the rich and the consumption of infant formula. "'All-Pure'", claimed one 1968 Vietnamese ad, is "'produced by Meyenberg, the biggest company in the U.S. My family is happy and my baby is healthy.'" (ibid., p. 2). The desire for status improvement is thus mobilized by presenting a product intrinsic to the lifestyle of "better-off people" in a "better-off" society.

The connection of infant formula to the affluent lifestyle in the mind of the prospective consumer is further extended by frequent references to medical endorsement. Seals of the American Medical Association, or encouragement to consult a doctor, link the formula product to the authority and status of the scientific medical community. This aspect of media advertising builds upon the close links that interpersonal marketing promotion has undertaken in hospitals, clinics, and maternity wards. Evidence now seems to indicate this latter aspect of promotion, rather than the more visible media advertising, as the most effective means of influencing the target population.

That advertising per se is not the only factor in formula promotion should cause great concern, as it is this activity which has received most attention. The WHO/UNICEF meeting in Geneva in 1979 recommended a ban on formula advertising to the public, and a decrease in media advertising has already been observed in some countries, e.g. Guatemala (Koniz et al., 1979). Yet, as an infant formula company itself has stated, "Media advertising is on the whole ineffective in generating sales of infant formula....Its main purpose is to maintain brand awareness." (Wickstrom, 1977). Once this awareness is widespread, and bottle feeding is already to some extent prevalent, "personal communication will reinforce mass media and the innovation might even continue to spread without the need for these media. Restrictions on advertising would then not necessarily mean that there would be no further adoption of bottle feeding." (ibid., p. 19).

The scope of formula promotion being investigated must therefore be extended from the specific use of mass media advertisements (which in recent years has declined) to the entire, complex, and sometimes subtle patterns of influence exercised by companies through their personnel and within the institutions of each nation's health services. Many concerned observers around the world seem to concur that the actual or perceived endorsement of bottle feeding by health personnel is critical in influencing mothers to bottle feed.

There is much evidence to support this conclusion. Surveys have shown that hospital-born babies are more likely to be bottle-fed than babies born in the absence of medical supervision. A study in Guatemala, for example, found that only 18.6% of those born at home received breast milk substitution prior to six months of age, while over 41% of the children born in hospitals or clinics received breast milk substitutes prior to six months of age (Koniz et al., 1977). In an extreme but not atypical case, the postnatal mother does not even have the choice to exclusively breastfeed. She may not receive her already bottle-fed baby until after the first day (ibid.).

Why is it that hospital routines actively discourage breastfeeding? One reason is that infant formula companies have put considerable effort and resources into influencing medical and pediatric personnel. A constant flow of promotional material, partly through medical journals, but also through pamphlets and other medical literature distributed directly, touts the quality of company products, emphasizing their similarity to breast milk (Baer, 1978). As noted by Baer, "no analogous information is made available about the advantages of breast feeding." (ibid., p. 4).

In addition to the information barrage, "small gifts to doctors at Christmas or on birthdays or other occasions are routine." (Borgoltz, 1979, p. 13). "Companies also support doctors' professional societies, sponsor conferences, provide research grants, scholarships, and prizes to many doctors who participate." Little wonder, then, that a correspondent in Brazil writes that the "medical profession in this country is convinced that Nestle is the best thing that ever happened to nutrition or pediatrics in Brazil." (ibid.).

Visits by company detailmen to the offices of doctors and pediatricians are a focal point of direct promotion to health professionals. Borgoltz has observed that "the importance of these detail personnel in formula marketing is attested by their large number. For instance, a major U.S. formula company had in 1961 a staff of 165 detail persons, or about one per 100 pediatricians in the country. In the Philippines alone, a study of the five major companies indicated that they employed in 1975 an average of 35 detail persons/nurses, enough to keep a strong pressure on professionals and conduct also extensive 'mothercraft selling' activities." (ibid.). The function of detail personnel is to persuade doctors to write prescriptions for the firms' products, provide information to doctors concerning new products and further developments in use of existing products. They also distribute samples and product literature to doctors, and, according to Smith, are to "tell of the experience of one doctor to another, an important message in the doctor's acceptance of the product." (ibid.).

The advantages of this promotional strategy result from its direct, face-to-face encounter format. Two-way communication is flexible, and "can be tailored to fit not only the individual pediatrician, but also the particular situation in which the interview is conducted.... The opportunity exists to respond directly to potential objections or negative feelings." (ibid., p. 13). Detailing has been one of the most efficient means of obtaining the important "repeat prescribing pattern": one survey indicates that contact with company personnel is the most frequent and "most useful" source of information to doctors (Gaffing in Greiner, 1959). The power of this promotional strategy resides in the desire of the mother to provide continuity in her child's feeding, which, combined with the medical endorsement of the pediatrician's advice, will likely lead to continued demand for the product long after the mother leaves the hospital.

Surveys among pediatricians, nurses, obstetricians, medical students in Guatemala, the Philippines, and elsewhere expose the near-universal impact of promotion through the health professions. Many Guatemalan doctors perceive infant formula as a positive nutritional supplement (Koniz et al., 1979). In the Philippines, "the attitudes and practices of many health workers indicate that they view bottle feeding as a perfectly acceptable alternative to breastfeeding. More than a few seemed better informed about the alleged counter-indications of breastfeeding than about the benefits it confers." (Baer, 1978, p. 8).

The influence of industry upon professionals has been termed by D. B. Jelliffe as "manipulation-by-assistance." One aspect of this assistance is the provision of free gifts of formula to doctors' families for their own private use; they seldom take into account the acute survival-crisis which adequate formula purchases would impose on a poor family.

Borgoltz cites several other factors involved in the price-incentive nature of the decision to introduce infant formula:

"First, the economic burden associated with the medical choice tends to be thought irrelevant to good practice. Because health is involved, quality and availability of the product has more importance than price. Second, the main "deciders," pediatricians or maternity staff, do not bear the costs implied by their decision. Thirdly, price insensitivity is further reinforced by the fact that for formula, consumption at the time of the prescription is much less than the consumption it is going to generate in the future.

Furthermore, the consumers who pay for the product and bear the costs are not in a position to evaluate the cost implications of the decision." (Borgoltz, 1979, p. 7)

Publicly-employed doctors and health personnel are instrumental in aiding formula promotion, but many multinational companies themselves have provided "medical representatives" and milk nurses to carry out direct sales promotion to mothers in maternity wards and hospitals.

During the period immediately following childbirth, the mother is most vulnerable to influence regarding the health and care of her baby. Personnel linked in some way to scientific knowledge are in an especially advantageous position, having high credibility. Companies seek to capitalize on this fact, as well as on the concentrated accessibility of the prime target group in maternity wards. A study of milk nurses in Jamaica was conducted in late 1974 by the Caribbean Food and Nutrition Institute. The data disclosed the employment of milk nurses by Mead Johnson, Jamaica Milk Products, a Nestle subsidiary, and by the distributors of Glaxo Laboratories, and Cow and Gate (Ledogar, 1975).

The nurses' function is to make contact with mothers of all income levels and promote the companies' formula products. According to Ledogar:

"The Jamaica Milk Products nurse, who sells Nestle products, is allowed to enter maternity wards in public hospitals in rural areas in order to talk to mothers directly. The mothers visited often do not have adequate income to feed their children artificially, but, in general, nurses do not tell mothers about the costs involved in artificial feeding." (ibid.)

The use of milk nurses is common in most countries of the Third World. In the Philippines, Nestle, Wyeth, and Mead Johnson all employ medical representatives. Nestle medical representatives are said to be all nurses, nutritionists and medical technologists. They wear dark blue uniforms, a Nestle pin, and an ICIFI badge. They do not have the authority to make home visits, but do conduct "mothercraft" classes in hospitals and clinics (Baer, 1978).

Formula promotion does not have to advertise the product as explicitly superior to mother's milk in order to be effective. It needs only

to implant doubts in expectant and postnatal mothers about their ability to breastfeed adequately:

...many of the doubts implanted are based on incorrect or outdated information. Nestle's "A Life Begins," for example, tells mothers that bottle feeding "must" replace breast feeding "should you fall ill" (ask doctor's advice), if you do not have milk or if it is of poor quality or if your nipples develop cracks or become infected." None of these caveats seems justified, however. Medical and maternal experts on breast feeding indicate that ordinary illnesses or breast infections usually do not interfere with nursing, and that, though it is likely to be painful, nursing may even be continued if the nipples crack. Women who "do not have milk" are relatively few, although lactation does stop in cases of prolonged famine. As for the question of "poor quality" milk, except in cases of severe maternal malnutrition, breast milk by itself is usually adequate to sustain growth and excellent nutrition in the infant for four to six months. It is true that if maternal nutrition is poor, the production of breast milk may weaken the mother. But as many nutritionists point out, the solution to this problem is not bottle feeding for the infant, but rather an adequate diet for the mother during pregnancy and lactation. (Ledogar, 1975, p. 142)

Baby-care pamphlets distributed by milk nurses also undermine breastfeeding by recommending the early introduction of solid foods. As La Leche League warns, "the more solids the baby takes, the less milk he will want; the less he takes from the breasts, the less milk there will be." (ibid.).

Thus, Cow and Gate recommends its own brand of cereals for use from two to three months, "When it is time for more than milk." The Ostermilk Mother and Baby Book suggests introducing solid foods at "a few weeks of age, or even sooner if your doctor advises it." (ibid.).

Another method of undermining confidence in breastfeeding is by making it appear that breastfeeding requires just as much knowledge, inconvenience, and expensive equipment and facilities as bottle feeding does. Nestle has adopted this strategy in its baby booklet for Asia, "A Life Begins," by suggesting a myriad of breast and nipple exercises, preparation and cleansings. It advises the mother to "bathe your breasts daily, wiping the nipples with cotton wool, dipped in a mixture of spirits and glycerine, which will strengthen them and make nursing easier." (Greiner, 1977).

In conclusion, then, media advertising represents only the underlying background of marketing activities which succeed in generating demand mainly by their actions through the medical profession. As observed by Borgoltz, "Because most infant formula is introduced following a medical recommendation, usually the prescriptions at the release

from the hospital or clinic where birth took place, the product has achieved the status of a quasi-prescription drug. By transferring what is merely a product designed to sustain life and not designed to correct or impede existing medical problems in most cases into a quasi-prescription product, the characteristics of consumption become considerably different than for ordinary food consumption goods." (ibid., p. 4).

As Borgoltz states, the active role producers play in creating demand for their products "invalidates the belief that the free play of demand and supply determine the appropriate optimal allocation of resources." (ibid., p. 3).

Infant formula companies have intervened in the natural relationship between the mother and child in such a way that infant formula is perceived as a necessity for the good health and nutrition of her child (ibid.). The adoption of formula feeding can therefore be described as "a directed consumption pattern, where the principal decision-maker is usually not the consumer, but the pediatrician, and indirectly, the industry." (ibid., p. 3). And this intervention is lasting and significant because "The consumption of infant formula is a self-generating process. Introduction of infant formula and the bottle in the early days of life inhibits the successful establishment of a normal breast-feeding process." (ibid., p. 5).

4. Strategies to Stem the Tide

Legislation

Many developing countries today are facing the problem of the decline in breastfeeding as the promotion and acceptance of commercial infant formula is gaining ground. One of the strategic routes available to developing countries as a control over the promotion of infant formula is direct government legislation over the activities of the multinationals within their borders. An analysis of existing legislation and recommendations for the future will be presented along with possible repercussions resulting from such governmental actions.

Actual legislation controlling the promotion and distribution of infant formulas has taken place in such countries as Nigeria and Jamaica. Guinea Bissau's Ministry of Health has ordered that all powdered milk and glass feeding bottles be sold only on prescription. In Niger, milk nurses or any form of infant formula advertising in government health facilities has been prohibited (Greiner, 1977). The promotion of baby foods in health centers has been banned by the Barbados Ministry of Health, and in 1975 the largest state in North Brazil banned all formula salespeople, free samples of formula, and posters sponsored by formula companies from public hospitals and clinics. Since 1977 in Algeria, imported powdered milk has been controlled and marketed under a single brand name, and in Zambia the only powdered formula available had been nationalized and displays "Breast feed your child" on the label (Hewson, 1978).

A good example of a government's action to preserve breastfeeding took place in Papua New Guinea where in 1977 the "Baby Feed Supplies (Control) Act" became law. Since 1975 the Papua New Guinea government has become more aware of the increase in malnutrition and diarrheal diseases in young children. A marked decline in breastfeeding in the capital of Port Moresby between 1962 and 1972 paralleled a trend in increasing diarrheal diseases. Thus in an attempt to halt the decline of breastfeeding in urban areas and prevent the trend from spreading to the rural areas, feeding bottles, dummies and teats were made available only on prescription from a registered health worker. A ban was also put on all radio advertising of baby bottles, teats and formulas. Fines are imposed on health workers, shopkeepers, or others who supply bottles illegally. As well as the legislative controls imposed by the government, an emphasis was placed on the education of health workers, school children and the community as to the importance of breastfeeding, with breastfeeding actively promoted in the hospitals. Thus the approach taken by the Papua New Guinea government was "two-pronged" by combining both legislation and education. An official evaluation of this legislation has not yet been made available, however a survey in March 1979 in Port Moresby found a highly statistically significant decrease in artificial feeding since a similar survey was done in 1976 (Biddulph, 1979).

In October 1979 under the auspices of WHO and UNICEF a "Meeting on Infant and Young Child Feeding" took place in Geneva, Switzerland. Experts from both developed and developing countries met with scientists and infant formula representatives to discuss the current controversies. The final report of the meeting included various strategies governments might take to preserve breastfeeding. Specifically they stated that governments should adopt the recommended international standards concerning food for infants and young children developed by the Codex Alimentarius Committee on Foods for Special Dietary Uses to ensure nutritional value and safety. Strict legal standards should also be used to regulate production and distribution of foods for infants and young children. The WHO report also recommended that monitoring of marketing practices of infant formula companies should be employed, with advertising councils and industry, consumer and professional groups being involved as well. Included in the report was the request for an international code of marketing of infant formula and other products used as breast milk substitutes with both importing and exporting countries and all manufacturers observing it. WHO/UNICEF were requested to implement the process of its preparation in order to reach a conclusion as soon as possible. (In 1981 such a Code was adopted overwhelmingly at the World Health Assembly in Geneva. Only one country, the U.S.A., voted against the Code.) Another important point for the control of the promotion of infant formula which the WHO/UNICEF report briefly covered, and which Greiner in his writings strongly supports, is the banning of infant formula samples to doctors, health workers and new mothers (WHO/UNICEF, 1979).

An interesting approach suggested by Lall as quoted in Greiner is a noncommercial strategy which deals with brand name drugs and the pharmaceutical industry, which are analogous to infant formulas, in the Third

World. He suggests that every country draw up a list of drugs essential to the well-being of the majority of its population. When the developing country makes its decision on what drugs or what infant foods it really needs the appropriate amounts required could be estimated and the least expensive import (or local manufacturer) could be sought. The product could be packaged locally and with appropriate labels by the governments and thus the competitive public promotional activities of the manufacturers would be curtailed. The commercial image would be removed from infant foods and also it would be economically advantageous at both the family and national levels (Greiner, 1977).

In regards to the relationship of multinationals and developing countries, B. C. Hewson (1978) emphasizes the necessity of host country regulators having greater access to information on the activities of the multinationals in other developing countries. The affiliates of multinationals should reveal to the host countries any sales prohibitions and restrictions imposed on them elsewhere. A greater degree of coordination is needed among policy makers in different developing countries in order that a more efficient control over multinational activity is achieved.

An extremely important aspect to be considered which involves the control of infant formula by government regulations are the possible adverse repercussions. Price controls on infant formulas may take two routes: lower prices may lead towards more widespread use of bottle feeding, while higher prices may lead to overdilution by mothers unable to afford adequate amounts of the formula. If the availability of infant formula was restricted, a mother might turn to a less than ideal feeding pattern by using less desirable foods such as sweetened condensed milk. Makeshift bottles, like soft drink bottles, might be employed with crudely made teats attached if feeding bottles were restricted. Such devices are undesirable, especially in respect to hygiene. Placing formula on a prescription basis might make the formula powder seem drug-like, thus if a "standard-dose" of milk powder is good, a "homeopathic-dose" of milk powder would at least do a little good and so overdilution would be the final outcome (Greiner, 1977). Another feasible problem is the creation of a blackmarket for infant formula and feeding devices if restrictions and bans on them are imposed.

Thus, only after careful consultation with the appropriate experts in social, legal, economic and nutritional areas should governments impose import restrictions, price controls and placing formulas on a prescription only basis (Greiner, 1977). Jelliffe and Jelliffe emphasize the great need for raising the consciousness of policy makers in developing countries in regards to the significance of sound infant nutrition. Adequate education in nutrition, including breastfeeding, must be provided in the curricula of medical and nursing schools. Modern nutrition education for the public needs to be funded from government sources and channeled through the mass media health services and school systems (Jelliffe and Jelliffe, 1978). Papua New Guinea provides an excellent example since they employed a "two-pronged" approach of combining both government legislation and education in order to control the promotion

of infant formula in their country. For any governmental action on restricting, banning or labelling to be effective, the past cumulative effects of advertising must be overcome by education. In Greiner's words (1977), "without any appropriate education of the public, there is little hope for the reversing trend from breast to bottle." (p. 30)

Educational Strategies

In developing an educational program, it is important to recognize that such programs stimulate cultural change and therefore success is dependent ultimately on satisfactory incorporation at all levels of society. Unfortunately, it is usually outside of the scope of educational programs to attempt large-scale "propaganda" programs that identify and work with more than the isolated target population. Constraints of time, money and facilities hamper large-scale programs in almost all situations. The developer's awareness of the interrelationship between individual behavior and cultural sanctions can, however, facilitate program development and acceptance, as well as make inroads into change on a larger scale.

While the link with each culture necessitates individualization of education programs, it is possible to develop a basic model which can be modified as needed. The first step in developing such a model is the identification of the target population. Two distinct types of target population (Tonon, 1978) have been recognized and their inherent differences necessitate different strategies. The first type can be termed a self-generating population and the second is a non-generating population. The self-generating population is the easier to work with since it perceives a need but is unable to act appropriately to satisfy the need because of lack of information concerning methods of achieving the stated goal. The program then attempts only to determine and ensure that the target has accessibility to reach the goal and provide appropriate information in a culturally acceptable manner. The non-generating population on the other hand presents a more difficult situation since these populations are usually characterized by a negative response to the change in question. Characteristically the behavior to be changed is either an integral or habitual part of the culture or there is a lack of recognition of need to change. The initial aspects of the program then must be concerned with convincing the target population of the necessities and/or benefits of the change. Once the change has been accepted, however, this population is comparable to the self-generating population.

It is also recognized that the needs of the population must be determined and characterized as needing either a curative or preventative approach. This identification should be made in conjunction with local health and nutrition workers who are able to assess the urgency of the intervention as well as some of the causal factors in any endemic health problems.

In order to be effective, all programs should include an awareness of the psycho-social determinants of change (see: Rachman, 1970; Tonon,

1978). The social distance between the program personnel and the target population should be sufficiently small so that the perceptions of the latter are an integral component of the program. Interpersonal contact is a vital aspect of all programs and success is limited without it. Currently some researchers are beginning to encourage the use of "positive deviants" as source personnel within the project (Wishik and Van der Vynckt, 1976). However, identification and utilization of such individuals must be done with care. Finally, in order to be effective, a program must involve the target population in the planning, design and dissemination of the program (Tonon, 1978).

The encouragement of breastfeeding in a population more than many other nutritional and health programs necessitates the incorporation of a social support system. Breastfeeding in humans appears to be a social behavior which must be learned in a supportive interaction system (Brock, 1975). Consequently, any educational program must recognize and work with the social-psychological, the interpersonal and the cultural determinants of behavior.

Further, if education is to be a viable strategy for the promotion of breastfeeding, those concerned with utilizing it must be familiar with information as to the relative effectiveness of education in providing information and/or behavior change in various situations and with various approaches. To date, much more emphasis has been put on formal education, and implicitly based on the assumption that the recipients consist of self-generating groups. And even with all the drawbacks inherent in those approaches, some programs have made significant changes in people's knowledge and even in their attitudes.

In planning programs, educators should examine carefully their goals, the alternative methods available, the intended recipients, the choice of who will deliver the content, the settings and time, and the actual substance of their programs. Within each of these aspects are alternative choices, and each educational situation will require a different combination of choices. For example, urban educated women will be receptive to different messages, methods and settings than will rural women. The urban woman who is already convinced that she prefers to breast feed but feels constrained from doing so because of economic pressures to work (self-generative) needs to be approached differently than the urban woman who is already "hooked" on bottles, believing breast feeding will adversely affect her figure, social status, and her time (non-self-generating in terms of breastfeeding).

Different messages and strategies will be required for different times in a woman's life. Ideally a woman should be convinced (or not) of the value of breastfeeding before she is pregnant, or if not, at least before she delivers. In terms of formal educational intervention, this means emphasizing the value of breastfeeding in school curricula (and not excluding boys) and in ante-natal clinics. Traditional midwives can play an important role. Generally, they already favor breastfeeding (or at least haven't given much thought to bottle use). Yet, they need to be encouraged to stress the need for breastfeeding and the danger of

bottle feeding. Paraprofessional and professional midwives working in hospital settings also need to be educated as to the benefits of breastfeeding. When mothers bring their babies for clinic care, the emphasis will be different depending on whether the mother is fully breastfeeding, mixed feeding or totally bottle feeding.

As breastfeeding is primarily a nutritional question, at least in developing countries, the attempts to encourage it should be an integrated part of a nutrition education program. There have been any number of studies carried out in nutrition education programs sited at clinics. Here, brief reference is made to just one, as reported by Ghosh et al. in a recent issue of the Journal of Tropical Pediatrics. The clinic reported on made use of visualization as an effective innovative approach to nutrition education. The mothers in the project were exposed to posters which clearly and pictorially indicated types and amounts of food to be fed their infants. These women were also exposed to demonstrations that accurately reflected local facilities, situations, and foodstuffs. An improvement in weight was seen in 77.4% of the children whose mothers attended this clinic. A vital part of that program was an emphasis on the need for breastfeeding as an integral part of the child's nutrition. And, if other studies replicate the results of this one, utilizing visual reinforcement, then perhaps greater emphasis should be given to utilizing visual symbols in as many situations as possible. Calendars, posters, pamphlets, billboards (if they already exist anyway), buses, etc. are sources for displaying visual reinforcement of breastfeeding.

The promotion of breastfeeding and general nutrition education certainly ought not to be limited to mothers and prospective mothers. Substantial changes are being called for in the medical training of doctors and nurses in order to incorporate more emphasis on community health, teamwork, and nutrition. Certainly an emphasis on the value of breastfeeding needs to be an important part of these changes. Policy makers need to be educated to the multi-faced benefits of breastfeeding and those interested in promoting breastfeeding at that level could probably benefit from knowledge about decision making theory.

Nutrition education ought not to be limited to the provision of information by professionals to passive audiences to improve the results of clinic-based formal education but more emphasis might be placed on community involvement in the health centers and clinics (Bernez, 1976). This involvement can come in the form of indigenous paraprofessional staffing of the clinics (Antrobus, 1977); community involvement in the evaluation of programs (Galbraith, 1976); and community help in the design of messages.

The term education need not be limited to those situations in which people are directly interacting, but can and should encompass utilization of mass media. The aim of an educational campaign is to move the society along a continuum starting with an awareness of possible solutions, to experimentation, satisfaction and finally changed or reinforced behavior. Mass media is particularly useful in the early stages of making a society group aware of problems and possible solutions (Marriott,

1976). In the case of nutrition education, and specifically breastfeeding, the most formidable task facing the educator may very well be to counteract the misinformation and miseducation propagated by commercial interests. In such efforts, the media will also have to make a strong moral and professional commitment in order not to be co-opted by the money and pressure of corporate interests.

If nutrition educators are going to utilize the media well, then they will have to be aware of the complexities of mass media utilization. Manoff described the radio use of the "reach and frequency technique" in a Philippine campaign to get mothers to add oil, vegetables and fish to the porridge normally fed to infants. This technique employed a mini-drama to present the idea. They chose a scene that took into account such considerations as the perceived authority of the person delivering the care message (a doctor), the reaction of the audience in terms of the persons recommending change (a grandmother), and the emotional implications of accepting change (the same grandmother and her daughter). The mini-drama gave the educators a chance to present the idea and have it challenged while playing out the psychological concerns that are a part of the issue. The results were statistically significant in terms of behavior change as well as knowledge. The point is that educators should not assume they have to rely totally on interpersonal communication to educate, but can make well-studied utilization of the mass media as well.

If we are serious about educating communities to the need for breastfeeding, then we must not only educate mothers already attending clinics, but must consider every possible opportunity and every possible means to educate everyone. The government of Jamaica has undertaken such an effort in its Nutrition Education/Communication Campaign. The intention of this mass media campaign is to produce an awareness of the nutritional status of the Jamaican population and an awareness of the means whereby existing nutritional problems may be alleviated through correct dietary habits. The media will be used in conjunction with introductory seminars to enlist support of community leaders, and as part of an ongoing Primary Health Care program. We would hope as a part of their educational efforts in this campaign, that the government and educators would encourage the use of innovative methods, such as the methods of Paulo Freire.

Paulo Freire's Method

Paulo Freire's philosophy of education has some fundamental elements which he believed were necessary for the conscientização of oppressed people in developing countries. Some fundamental elements of Freire's philosophy are:

- a) rejection of the banking concept of education, as characterized by "the teacher teaches and the students are taught; the teacher knows everything and the students know nothing; the teacher thinks and the students are thought about; the teacher talks and the students listen--meekly; ...the teacher

chooses and enforces his choice, and the students comply; ...the teacher chooses the program content, and the students (who were not consulted) adapt to it; ...the teacher is the Subject of the learning process, while the pupils are mere objects." (Freire, 1970: 59).

- b) teacher as a co-investigator in problem-posing education based on dialogue with the people;
- c) culture and history as central basic themes through which people express their awareness of reality;
- d) the person as not existing apart from the world or apart from reality, thus education beginning with the people-world relationship;
- e) "Problem-posing education (which) affirms men as being in the process of becoming" (Freire, 1970: 75) -- as unfinished human being transforming a likewise unfinished reality

What role, then, does this education play in the breastfeeding vs. bottle-feeding issue? Political action against bottle-feeding as a replacement for breastfeeding in the Third World countries must ultimately be taken by the oppressed people themselves. Efforts from the outside only may serve to further the oppression. Freire defends the

"...eminently pedagogical character of the revolution. The revolutionary leaders of every epoch who have affirmed that the oppressed must accept the struggle for their liberation--an obvious point--have also thereby implicitly recognized the pedagogical aspect of this struggle. Many of these leaders, however..., have ended up using the 'educational' methods employed by the oppressor. They deny pedagogical action in the liberation process, but they use propaganda to convince." (Freire, 1970: 54-5)

"Political action on the side of the oppressed must be pedagogical in the authentic sense of the word, and therefore, action with the oppressed. Those who work for liberation must not take advantage of the emotional dependence of the oppressed--dependence that is the fruit of the concrete situation of domination which surrounds them and which engendered their unauthentic view of the world. Using their dependence to create still greater dependence is an oppressor tactic." (ibid., 53)

The lives of people do not progress unless they take hold of their lives. The people are the ones most capable of breastfeeding and refusing commercial formulas. The expertise and potential for quick action lie in the people. Thus, the educational process by which this potential is realized must be an education of the people, by the people, for the people. Education from the people will then flow to local leaders

in business and government, and to national and international parties concerned. If the national and international leaders are not reached, the people can already be in control at least of their own lives in that they have already decided, e.g. for breastfeeding. Money for food, equipment and demonstration materials are not needed to show and discuss breastfeeding.

In the pedagogical process of Freire, the educators are explicitly the people being educated. The group of people in dialogue educate one another, including the one who instigated or facilitates the dialogue. Inherent in each-person-as-educator is a respect for and trust in each person:

"To achieve this praxis, however, it is necessary to trust in the oppressed and in their ability to reason. Whoever lacks this trust will fail to initiate (or will abandon) dialogue, reflection, and communication, and will fall into using slogans, communiques, monologues and instructions." (Freire, 1970: 53)

The educators trust one another and themselves, and construct their own agenda. All are equally involved in the discovery, reflection, and critical analysis:

"Human beings are active beings, capable of reflection on themselves and on the activity in which they are engaged. They are able to detach themselves from the world in order to find their place in it and with it. Only people are capable of this act of 'separation' in order to find their place in the world and enter in a critical way into their own reality. 'To enter into' reality means to look at it objectively, and apprehend it as one's field of action and reflection. It means to penetrate it more and more lucidly in order to discover the true interrelations between the facts observed." (Freire, 1973: 105)

Drummond, in her experiment with the Freire method in nutrition education in Brazil, found that people were involved in discussions about undernourishment. "Comments during and after meetings showed that people were at least questioning the old fatalistic attitude and beginning to wonder whether something might not be done to further the health of their children." (Drummond, 1975: 45). The conviction that questioning leads to is more authentic and permanent than any conviction generated by the banking method of education or by propaganda. "This conviction cannot be packaged and sold; it is reached, rather, by means of a totality of reflection and action." (Freire, 1970: 54)

All parties involved in this process of education are subjects. As subjects they convince themselves; as subjects they transform their lives:

"likewise, the oppressed (who do not commit themselves to the struggle unless they are convinced, and who, if they do not make such a commitment, withhold the indispensable conditions for this struggle) must reach this conviction as Subjects, not as objects. They also must intervene critically in the situation which surrounds them and whose mark they bear; propaganda cannot achieve this. While the conviction of the necessity for struggle (without which the struggle is unfeasible) is indispensable to the revolutionary leadership (indeed, it was this conviction which constituted that leadership), it is also necessary for the oppressed. It is necessary, that is, unless one intends to carry out the transformation for the oppressed rather than with them. It is my belief that only the latter form of transformation is valid." (ibid., 54)

Paulo Freire believes that man's thinking, his awareness of reality can be represented as generative themes. The teacher or leader of the "culture circles" codifies these generative themes. These generative themes then become the basis for investigation and dialogue within the discussion groups or culture circles. What are generative themes and how are they codified? An example of a generative theme might be the importance of work within society. This theme is codified in any of several ways: as a picture showing men and women working in the fields; as a community member describing his daily work, or as an exhibit of some products of labor within the community, e.g. pottery, hand-sewn articles and harvested crops. The generative theme--work within the community--is a starting point for dialogue between group members.

Generative themes may be codified in four general ways: pictorial, graphical, auditory, and tactile. The more ways the generative theme is codified, the greater will be the people's identification with the theme and the greater also their understanding.

"When people are presented with the coded representation, they tend to describe what is seen (or heard or felt) by taking apart the situation, which in turn facilitates the discovery of the interaction among the parts of the disjoined whole." (Drummond, 1975: 13)

Such methods, then, as use of posters, Ilesha growth charts, cassette recordings, and dramatic presentations could be useful in codification of generative themes.

The teacher (culture leader) does not try to dominate or lead the discussion, or structure the dialogue but takes an active part as participant. From time to time he (she) may ask pointed questions: Is it necessary that we join together to demand higher wages? These are purposely interjected not as statements of doctrine but posed as problems to be investigated.

Since food plays an important role in the culture and history of any society, at some point it would naturally become part of a generative theme for group discussion. Nutrition and breastfeeding also could easily be introduced as generative themes or most probably would "flow freely" from the generative theme of food. Breastfeeding in particular has strong roots in the culture and history of people in developing countries. The theme of breastfeeding may be easily codified in any number of ways; perhaps the best might be a breastfeeding demonstration by a mother of the community discussing her feelings, etc. Within this context bottle feeding might also (and perhaps should) prove an important generative theme for discussion.

The process of reflective dialogue and problem-posing is not a quick process. It cannot be implemented where a "quick project" is needed to achieve something. It is a long-term, ongoing process, perhaps a life-time process of adult education. Drummond found that Freire's method "certainly could never be attempted in a short-term project. ...A three-month period is not sufficient for any real testing of the method." (Drummond, 1975: 17). However, she found that a longer effort would be justified. The teacher who is schooled in the banking concept of education would have difficulty adjusting to such a long-term process. Perhaps the reason one so often hears that Freire's method "won't work" is that it has not been tried.

The process focuses on the inter-relatedness of the people's lives, on their reality as a whole. Thus, a leader's pre-conceived agenda will only be accepted to the extent that it is an aspect of the people's culture and that it is generated by the group in its time. "Knowledge is not 'extended' from those who consider that they know to those who consider that they do not know. Knowledge is built up in the relations between human being and the world, relations of transformation, and perfects itself in the critical problematization of these relations." (Freire, 1973: 109). The outsider has little expertise in the complexity of a people's lives. "Those who work with poverty are often tempted to intervene massively and rapidly with the expectation of quick results, yet the effort may sometimes be disappointing because of insufficient knowledge of the human and environmental variables and their interactions." (Drummond, 1975: 17). In commenting on themes, Drummond suggested that even though people identified with a specific theme, "it would have been of greater usefulness and depth if it could have been worked out as part of an integrated whole." (ibid., 44). Freire refers to this integrated whole in terms of the physiological organism's nervous system:

"All these aspects are contained within a cultural totality. As a structure, this cultural totality reacts as a whole. If one of its parts is affected, an automatic reflex occurs in the others. A solidarity exists between the various dimensions which constitute a cultural structure." (Freire, 1973: 108)

The philosophy and methods of education of Paulo Freire are novel approaches. His methods do not attempt to negate a people's sense of

pride in themselves and their culture. Rather they give people freedom to discuss, to inquire and ultimately to learn. It is clear that if educators are open to the influence of Freire's ideas, their attitudes and methods will be different from those commonly encountered among people working for reform and development in Third World nations.

Finally, the objective or goal of this pedagogy also lies in the people who are educators being educated. It cannot be determined ahead of time or by an outsider. The process leads to what the people want relative to a theme on which they have reflected. It may be what the expectant mother wants for the child-to-be. Ultimately and continually, the goal is the development of the people, becoming more human--through language and communication, through work, through health, and through all aspects of their lives. It may result in influencing local leaders or national leaders to cease importation of infant formulas, if this conscientização is widespread. But it must go beyond and beneath activism:

"It is only when the oppressed find the oppressor out and become involved in the organized struggle for their liberation that they begin to believe in themselves. This discovery cannot be purely intellectual but must involve action; nor can it be limited to mere activism, but must include serious reflection: only then will it be a praxis." (Freire, 1970: 52)

Breastfeeding is only one aspect of a people's reality. Education helps one discover the whole reality. Education, then, is the dynamic force through which man comes to "know" reality and ultimately transform it.

In words of Gabriel Mistral, Chilean poet and Nobel prize winner:

"We are guilty of many errors and many faults, but our worst crime is abandoning the children, neglecting the fountain of life. Many of the things we need can wait. The child cannot. Right now is the time his bones are being formed, his blood is being made and his senses are being developed. To him we cannot answer 'Tomorrow'. His name is 'Today'."

"Nosotros somos culpables de muchos errores y muchas faltas, pero nuestro peor crimen es el abandono de los niños, negandoles la fuente de la vida. Muchas de las cosas que nosotros necesitamos pueden esperar. Los niños no pueden. Ahora es el momento, sus huesos están en formación, su sangre también lo está y sus sentidos se están desarrollando. A él nosotros no le podemos contestar 'Manana'. Su nombre es 'Hoy'."

5. References

- Almroth, S. Breast feeding practices in a rural area in Jamaica. Master's Thesis, Division of Nutritional Sciences, Cornell University, 1976.

- Anon. International Labour Review. Ghana 103: 117-129 (1971).
- Anon. The Home Scientist 2(4): 16-30 (1973).
- Antrobus, A. C. K. The challenge of nutrition education in the Caribbean. *Cajanus* 10(1): (1977).
- Baer, E. Infant formula and infant nutrition in the Philippines. Testimony submitted to the Subcommittee on Health and Scientific Research of the Committee on Human Resources (1978).
- Berg, A. The Nutrition Factor. Washington, D.C., The Brookings Institute (1973).
- Bernez, E. G. A. Wanted - A new deal in health education. *Cajanus* 9(3): (1976).
- Bertrand, J. T. and W. E. Health education among the economically deprived of a Columbian city. *International Journal of Health Education* 22(2): (1979).
- Biddulph, J. Promotion of breastfeeding - Experience in Papua, New Guinea. (1979).
- Borgoltz, P. Economic and business aspects of infant formula promotion: Implications for nutrition policy in developing countries. A report submitted to UNICEF and WHO, Ithaca, N.Y. (1979).
- Brock, Datha Clapper. Social forces, feminism and breastfeeding. *Nursing Outlook* 23(8): 556-561 (1975).
- Cajanus (editorial). Nutrition education campaign launched. *Cajanus* 11(1): (1978).
- CIC, Brief. Excerpts from Senate Hearings on infant formula. The Corporate Examiner, New York, N.Y., Nov. (1978).
- Cremer, Hans D. Nutrition education and training, Part I. *Cajanus* 9(1): (1976).
- Cremer, Hans D. Nutrition education and training, Part II. *Cajanus* 9(2): (1976).
- Davidson, W. D. A brief history of infant feeding. *J. Pediatrics* 43: 74 (1953).
- Deem, H. M. and McGeorge, M. Breast feeding. *New Zealand Med. J.* 57: 539 (1958).
- Drummond, Therese. Using the method of Paulo Freire in nutrition education: An experimental plan for community action in Northeast Brazil. Cornell International Nutrition Monograph Series Number 3, Ithaca, N.Y. (1975).

- Fowler, M. A new era in breast feeding. J. Trop. Pediat. and Environ. Child Health 22(2): 34 (1976).
- Freire, P. Education for Critical Consciousness. Seabury Press, N.Y. (1973).
- Freire, P. Pedagogy of the Oppressed. Seabury Press, N.Y. (1970).
- Furtado, C. Economic Development of Latin America. Cambridge University Press (1976).
- Galbraith, R. Evaluation of health care in an African village. J. Trop. Pediat. and Environ. Child Health 22(4): (1976).
- Ghosh, S. et al. Domestic visualization: An innovative approach to nutrition education. J. Trop. Pediat. and Environ. Child Health 23(6): (1977).
- Gothefors, L., Juto, P. and Winberg, J. The case for breast feeding. Curr. Med. Res. Opin. 4 Suppl. 1, 9: 9-15 (1976).
- Grantham-McGregor, S. M. and Black, E. H. Breast feeding in Kingston, Jamaica. Arch. Dis. Childh. 45: 404 (1970).
- Gray, R. H. Breast-feeding and maternal and child health. Cajasus 9(4): (1976).
- Greiner, T. H. The promotion of bottle feeding by multinational corporations: How advertising and the health professions have contributed. Cornell University International Nutrition Monograph Series No. 2 (1975).
- Greiner, T. H. Regulation and education: Strategy for solving the bottle feeding problem. Cornell University International Nutrition Monograph Series No. 4 (1977).
- Hewson, B. C. Influencing multinational corporations: The infant formula marketing controversy, N.Y.U. International Law and Politics 10(1): (1978).
- Hugh, R. N. and Hawkins, A. B. EPI and IPAT anxiety scale performance in young women as related to breast feeding during infancy. J. Clin. Psychol. 31: 663 (1975).
- Hursh-Cesar, G. and C. Evaluation of the Population Field Information Services Project. Supported by USAID Office of Population (1979).
- Hymanson, A. A short review of the history of infant feeding. Arch. Ped. 51: 1 (1934).
- INFACT. Nestle buying campaign. INFACT Update, Issue #7, Dec. (1978).

- Integan, C. Nutritional evaluation of breast feeding practices in some countries in the Far East. *J. Trop. Pediat. and Environ. Child Health* 22(2): 63-67 (1976).
- Jelliffe, D. B. Infant nutrition in the subtropics and tropics. WHO Monograph Series No. 29, Geneva (1955).
- Jelliffe, D. B. and Jelliffe, E. Lactation, conception, nutrition and breastfeeding. *J. Pediat.* 81: 829-831 (1972).
- Jelliffe, D. B. and Jelliffe, E. F. P. Feeding young infants in developing countries: Comments on the current situation and future needs. *Forum* (1978).
- Kippley, S. and J. F. The relation between breast-feeding and amenorrhea: Report of a survey. *J. Trop. Pediat. and Environ. Child Health* 23(6): (1977).
- Latham, M. Infant feeding in national and international perspective: An examination of the decline in human lactation, and the modern crisis in infant and young child feeding practices. Cornell University (1977).
- Latham, M. C. The case against Nestle: Statement before the Governing Board of the National Council of Churches, New York (1978).
- Latham, M. C. Nutrition and infection in national development. *Science* 188: 561-565, May (1975).
- Ledogar, R. U.S. Food & Drug Multinationals in Latin America "Hungry for Profits." IDOC/North America, New York (1975).
- Leonard and Santorelli. The bottle feeding revolution in less developed countries. *Cajanus* 10(2): 78-80 (1977).
- Liebrich, U. and Morley, D. Attitudes towards breast feeding. *J. Trop. Pediat. and Environ. Child Health* 22: 31 (1976).
- Manoff, R. K. Innovative uses of mass media for food and nutrition promotion. *Cajanus* 9(5 & 6): (1976).
- Marriott, L. The mass media component of a food and nutrition policy. *Cajanus* 9 (5 & 6): (1976).
- McKigney, J. Economic aspects. *Am. J. Clin. Nutr.* 24: 1005 (1971).
- McNeilly, A. S. Physiology of lactation. *J. Biosoc. Sci. Suppl.* 4: 5-21 (1977).
- Muller, M. The baby killer. War on Want (1974).
- Myres, A. W. Breast or bottle feeding: Is there really a choice for the Third World? *Cajanus* 11(2): (1978).

- The Nestle Company, Inc. The infant formula controversy: A Nestle view. Nestle, New York, N.Y.
- PAG. Feeding the preschool child - Report of a PAG Ad Hoc Working Group. FAO/WHO/UNICEF PAG Document 1: 14/5, Oct. (1971).
- Popkin, B. S. and Solon, F. S. Income, time, the working mother and child. J. Trop. Pediat. and Environ. Child Health 22(4): (1976).
- Rachman, S. The modification of attitudes and behaviour. Malnutrition is a problem of ecology. Bibl. Nutr. Diet. No. 14, Karger, Basel/ New York (1970).
- Reutlinger, S. and Selowsky, M. Malnutrition and Poverty (1976).
- Robinson, M. Infant morbidity and mortality. Lancet 1: 788 (1951).
- Sanjur, D. M., Cravioto, J., Rosales, L. and VanVeen, A. Infant feeding and weaning practices in a rural preindustrial setting. Acta Paediat. Scand. Supplement 200, 3: (1970).
- Santorelli, L. The bottle feeding revolution in less developed countries. Cajanus 10(2): 78-80, (1977).
- Schoenborn, C. A. Breast feeding as a contraceptive method among a low income group of Tehrani women. J. Trop. Pediat. and Environ. Child Health 23(6): 274-276 (1977).
- Sim, F. C. The promotion of sweetened condensed milk as infant food. IOCU (1979).
- Simon, A. Bread for the world. Paulist Press (1975).
- Simoons-Vermeer, R. and Sim, F. C. The promotion of infant formula milk in Penang, Malaysia. IOCU (1979).
- Thompson, A. M. et al. The energy cost of human lactation. Brit. J. Nutr. 24: 565-571 (1970).
- Tonon, M. Models for educational interventions in malnourished populations. Am. J. Clin. Nutr. 30: 2279-2283 (1978).
- Tyson, J. E. Neuro endocrine control of lactational infertility. J. Biosoc. Sci. Suppl. 4: 23-39 (1977).
- VanBalen, H. and Ntabomvura, V. Methods of birth spacing, maternal lactation, and post partum abstinence in relation to traditional African culture. J. Trop. Pediat. and Environ. Child Health 22(2): 50-52 (1976).
- VanGinneken, J. K. The chance of conception during lactation. J. Biosoc. Sci. Suppl. 4: 41-54 (1977).

- Ward, W. B., Sam, M., Nicholas, D. D. and Pappoe, M. E. Impact of family planning information on acceptance at a Ghanaian rural health post. *Internat. J. Health Educ.* 21(4): (1978).
- WHO/UNICEF. Meeting of Infant and Young Child Feeding. Geneva, Oct. 9-12 (1979).
- WHO/UNICEF. Recommendations of the Meeting on Infant and Young Child Feeding. WHO/UNICEF, Geneva (1979).
- Wickes, I. G. History of infant feeding, Parts I-V. *Arch. Dis. Child.* 28: 151, 232, 332, 416 (1953).
- Wickstrom, B. Infant food companies in Europe and the United States and their policies for marketing in the developing world. A sub-project to WHO/CIE, Goteborg (1977).
- Williams, S. R., Worthington, B. S. and Vermeersch, J. Nutrition in pregnancy and lactation (1977).
- Wishik, S. M. and Van der Vynckt, S. The use of nutritional "Positive Deviants" to identify approaches for modification of dietary practice. *Am. J. Pub. Health* 66: 38-42 (1976).
- Wray, J. D. Breast-feeding and the urban poor of the Third World. Paper presented at Symposium on Biosocial Aspects of Breast Feeding. Boston. Feb. 21 (1976).

III. Infant Feeding Options for Bangkok Professional Women¹

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1. Introduction

The process of urbanization and modernization has progressed in Thailand's capital, Bangkok, to the point that the city of angels shares with western cities the problems of pollution, over-crowding, slum housing, and incredible traffic congestion. The distinctiveness of Bangkok as an urban center is not a recent phenomenon; Robinson estimates that the city was already large by 1850 with a population estimated at 300,000 (Robinson, 1977:6). This city of over four million is rapidly being transformed into a modern city with the technology and social organization typical of the great cities of Southeast Asia. Bangkok is the capital of the only Southeast Asian country that did not become a European colony. Nevertheless, Thailand has had a broad exposure to a range of western institutions. But as Thais have borrowed items of western origin, so they have altered them and given them new and distinctively Thai meaning. As Moerman writes in his discussion of modernity in Thailand, "When Thailand adopts to its own way of life, our needles and tractors, boy scouts and nationalism, it is childish for us to mutter continually, 'No, no, that's not the way to do it'" (Moerman, 1969:146). As items are borrowed they remain embedded in a Thai system of relations and meanings. This paper examines one part of the process of modernization, the increasing use of bottle feeding with infant formula among Bangkok's professional women, and raises the question of whether these changes are an inevitable result of urbanization and modernization.

Modernization as a process is very poorly defined (cf. Poggie and Lynch, 1974:3-4). Most definitions emphasize increasing structural differentiation, specialization, and division of labor, and a value orientation towards striving for increasing change. The definition I will use does not establish absolute standards or universal criteria

¹This research was supported by a seed grant from the O'Brien Fund, University of Notre Dame, and is preliminary to future fieldwork on this topic. Past research in Thailand was conducted under the auspices of the National Research Council of Thailand in a village in Uthong district, Suphanburi province (July 1971 - January 1972). From September 1973 to August 1974, I worked on an unrelated research project in Bangkok, but kept notes on the subject of infant feeding. As a research associate for a project on infant feeding practices in developing countries (including Thailand), I have had an opportunity to expand and rethink an earlier draft of this paper.

for modernization, such as the growth of rationality, secularism, or industrialization. Modernization is a concept encompassing several processes. I include within the concept, the process by which local or national elites select technological objects and ideas from the so-called developed nations, and incorporate them into their world view.¹ These reinterpreted imports become a reference standard for non-elites, and define for them what is modern. These objects, ideas and values, then, are formulated in relation to the ideas and behavior non-elites attribute to the national elites. What a Thai defines as modern would clearly differ from the definition of a Japanese or a Frenchman. In this example, both urban poor and rural women define what is modern and desirable by reference to elite urban women, such as the Bangkok professional women described here.

2. Methods

This work is based on a Thai questionnaire on childbirth and infant feeding practices administered in May 1974. These forms were distributed to a network of colleagues and former students from Thammasat University, Bangkok, and civil servants in various ministries. Of the 50 Thai questionnaires delivered or mailed out, 37 were returned and used in this study. From this small sample, it is not possible to generalize about urban Bangkok practices. Rather, this project suggests what factors are important to consider in preparing more comprehensive fieldwork in this area. Since this small study deals with a socio-economic sample not previously studied, it may provide a basis for comparisons with urban poor and rural Thai populations.

In addition to the survey results, my interpretations are based on participant observation and informal interviewing of a number of professional women and their servants over several months. Neighbors and former colleagues from Thammasat University instructed me on the correct way to raise a baby. Since my infant daughter was with me and my mother was not, I would need their instruction and advice on child care. These life experiences over the year provided much of the contextual basis for this analysis, and the knowledge of what questions were appropriate and meaningful in that cultural setting.

3. The Women

The relatively high status of Southeast Asian women in general, and Thai women in particular, is noted by most observers of Southeast Asian society (cf. Burling, 1965:2). In contrast to the position of women in Indian and pre-revolutionary Chinese societies, Thai women are dominant in commercial and economic domains, as well as in the household, and apparently have been so for many centuries (cf. La Loubère,

¹Chodak identifies modernization as a process of emulation, the transplantation of patterns and products from the achievements of other countries to one's own (Chodak, 1973:257). My definition emphasizes the interpretative process more than the emulation process.

1693:50). The equality between the sexes in both rural and urban communities was documented by the Hanks in 1958, and has remained essentially unchallenged as women have taken on newer roles in the last two decades. In an essay explaining this phenomenon, Kirsch cites an article reporting that "Thai women own about 90% of Bangkok real estate and have heavy interests in transportation companies, construction firms, and restaurants" (Kirsch, 1975:175). Although men outnumber women substantially in high-ranking government offices, women are well represented in the civil service, particularly in fields such as education, social welfare, and banking.

The informants who answered the questionnaire on infant feeding preferences were all professional career women who were working full time. They ranged in age from 25 to 64 years, with the majority of women in their thirties. Although they were all working in Bangkok, many of them were born in provincial towns and moved to the capital later in life. One-third of the women were born in Bangkok or Dhonburi, while the remaining two-thirds came from towns in the central plains, such as Ayutthaya or Samutprakan.

This group of women civil servants were exceptionally well educated; the majority of them (73%) continued their education beyond high school. In fact, one-third of them completed M.A. degrees in Thailand or abroad. To illustrate how atypical this group of women are, note that the 1964 official literacy rate for Thailand (based upon the capacity to read and to write one's name) was 71%. Only .6% of the total population are college graduates (Phillips, 1975:334). The M.A. and Ph.D. degrees, particularly from foreign universities, have become status symbols, much like the sakdi na (titles) in the older ranking system (cf. Dhiravegin, 1975:13). These women are largely employed by the government in civil service positions, with the majority teaching high school or college. Four women have careers outside the civil service.

4. Infant Feeding Preferences

Twenty-seven women in this sample had only one or two children. These women have a total of 73 children among them. In answer to a retrospective question about how they fed their children, the mothers reported a preference for infant formula over breastfeeding, and they clearly prefer to discuss their experiences with bottle feeding. Only nine infants were breastfed from birth without supplements of infant formula. Twenty-nine infants were fed with infant formula from the time of their birth, while thirty-four infants were fed a combination of breast milk and infant formula (mixed feeding).

Table 1. Methods of Infant Feeding

	1st child	2nd child	3rd child	4th child	Totals
Infant formula only	16	7	4	2	29
Breastfeeding only	4	3	1	1	9
Infant formula and breastfeeding (mixed)	17	11	5	2	35
Totals	37	21	10	5	N=73

The term weaning can be used to refer to the cessation of breast-feeding, to the substitution of artificial milk for one or two feedings, or to the first introduction of solid foods. The Thai term referred to the end of the nursing relationship between mother and child. The 49 infants who were nursed were weaned at the following ages. Note that these figures include infants who were given formula along with breast milk.

Table 2. Age of Weaning

Age of weaning	1st child	2nd child	3rd child	4th child	Totals
Less than 1 month	6	4	1	0	11
1-2 months	7	4	3	3	17
2-3 months	7	6	1	0	14
3 months - 1 year	4	1	1	0	6
Over 1 year	1	0	0	0	1
Totals	25	15	6	3	N=49

Table 1 shows that 44 children were breastfed, while table 2 indicates when 49 children were weaned. Six mothers who breastfed their children only 2 or 3 days did not identify themselves as nursing mothers, or even as mothers who combined breastfeeding and bottle feeding. Yet these mothers answered the questions on weaning. The most usual time for weaning babies is at 45 days of age, when the maternity leave for civil servants ends. For those women who were breastfeeding their babies, weaning presented no difficulty, for most of them were already supplementing their breast milk with infant formula. Those who were still fully breastfeeding simply substituted infant formula for breast milk and reported no difficulties. Four women reported that the baby weaned itself at 45 days, just as the maternity leave ended for civil servants.

5. Factors Influencing Choice of Infant Feeding Methods

There are numerous studies demonstrating the superiority of breastfeeding over bottle feeding for a variety of reasons; medical (Jelliffe, 1978), economic (Berg, 1973), and what might be called humanitarian (Cottingham, 1976; Muller, 1974).¹ It is clear that Thai professional women are relying heavily on imported infant formula. A recent marketing study for three American infant formula companies found a 76% usage of commercial milks in the first month of life in Bangkok (Gaither, 1980). The analysis of Thai survey data from 1969 to 1979 shows that women in Bangkok breastfeed less than rural women and less than urban women in other provincial cities (Knodel and Debavalya, 1980:40). The study also documents the decline of breastfeeding over time in both rural and urban samples.

To the extent that wealthy professional women can afford to purchase the formula and the equipment for sterilization, and have access to refrigeration, their children will probably be as healthy as North American children who are not breastfed. Of greater concern is the degree to which lower income urban women, and increasingly rural women, may emulate this pattern and judge infant formula to be more scientific, modern and progressive than breastfeeding. This is the critical issue, and it is to these groups of successful breastfeeding mothers that Latham suggests "preventative education" be addressed (Latham, 1977:ix). In order to carry out such policies, it would be valuable to know more about why women adopt certain infant feeding practices in urban centers. In the following section, I will look at six factors which relate to infant feeding preferences, and suggest to what extent each of them limit the choices available to these Bangkok professional women.

5.1 Family Structure

One factor which may contribute to the popularity of bottle feeding in urban Thailand is a change in the structure of the family. If support and information from family members is as critical as research indicates (Raphael, 1976; Ladas, 1972), then the increasing incidence of nuclear family households, at the expense of the traditional Thai

¹There is an extensive and growing literature on the medical advantages of breastfeeding. Jelliffe's work (1978) is perhaps the best known, and easily obtainable. The American Society for Clinical Nutrition published an important symposium in 1971, The Uniqueness of Human Milk. Another symposium on breastfeeding is published in the Journal of Tropical Pediatrics and Environmental Child Health (1975), a journal that Jelliffe edits and contributes to regularly. Another excellent publication citing a wide range of medical views in support of breastfeeding is the CIBA Foundation symposium 45 (ns) (1976, Elsevier Excerpta Medica, New York) entitled Breastfeeding and the Mother. A recent issue of Studies in Family Planning (12, 4, 1981) reviews the policy implications of breastfeeding programs.

extended family household, may be a factor to consider. The most common household arrangement among the women studied is the nuclear family, with the mother, father and children residing together with one or more servants who are often distantly related. Six women reported that they reside with their own mothers, and one woman also had her maternal grandmother living with her. One family resides with the husband's mother. Generally, these Bangkok women did not have their mothers and grandmothers to assist them on a permanent basis. As a rural Thai woman remarked incredulously, "How can a woman give birth and raise a child without her mother's assistance?"

It is difficult to assess the extent to which family members may have influenced the mother's decision on choice of infant feeding method. Most women (81%) reported making their decision about how to feed their infants some time before the baby's birth (usually during their pregnancy). In making this decision, 57% stated that they decided independently without advice from anyone. However, once the decision was made, most women (70%) did not recall any pressure to change their chosen method of infant feeding.

Twenty-three women said that their mothers breastfed them without any supplementation. These professional women might receive support and information on breastfeeding from their mothers. In their own generation, their sisters and friends generally used infant formula and could provide information on this feeding choice. In general, urban professional women are more isolated from older relatives who could provide child care or advice on breastfeeding.

5.2 Breastfeeding Problems

Another factor in the popularity of bottle feeding is the association of breastfeeding with problems--problems of clothing, problems of diet, problems of modesty--with no easily obtainable solutions. The problems identified by these women reflect the lack of breastfeeding information and support from family and medical personnel. There is no evidence of "successful nursing relationships" among these women, as defined by American La Leche League standards,¹ or by rural Thai standards. Very few women even began breastfeeding without supplementing immediately with infant formula.

Eight women (24%) reported no problems with their breastfeeding, but 19 women (51%) who tried breastfeeding cited pain, cracked nipples, too much milk, or the wrong shaped nipples as problems. The most common complaint was that they had insufficient milk, or no milk at all. This is not surprising since they began supplementing their breast milk with formula from the first day of birth, long before their own milk

¹La Leche League is a voluntary association of breastfeeding mothers who help other mothers who want to breastfeed.

supply could become established.¹ This supplementation will have reduced the stimulation for milk production.

To solve the problem of what they claim was an insufficient supply of breast milk, most women gave their babies more infant formula. Four women suggested alternatives that inferred they had some idea of how the process of lactation worked. These women said they drank more liquids, ate a special vegetable soup (*kaeng liang*), a rural galactagogue, to increase the supply of milk, and let the baby nurse longer and more often. Other solutions included going to the doctor for advice, and using a breast pump. It is interesting to note that in response to this same question asked in a central Thai village, the unanimous response was to allow the baby to nurse more often and longer (cf. Van Esterik, 1976).

Most women who nursed their babies only did so at home and in private but four women said that they would nurse their babies elsewhere if it became necessary and if they were dressed appropriately. The only Bangkok women one sees nursing their babies in public are market vendors. Professional women leave their babies home with servants as much as possible, and are seldom seen in public with their infants. When they leave home, the women freely substituted infant formula for breast milk if they were still breastfeeding.

One woman allowed a relative to breast feed her baby in her absence. Most women believed that the breast milk from other women might not be clean, and feared that the baby might contract a contagious disease. One mother pointed out that the breast milk of one mother would not be the same as the breast milk of another. Although I have no direct evidence on this subject, I overheard two servants discussing their young infant charges. Both women were breastfeeding children of their own, and breastfed their employers' children also whenever they fussed. It may be, then, that wet nurses are still used, although the professional women lacked or denied knowledge of it. Certainly, in the not too distant past, wealthy families and the nobility would use wet nurses on a regular basis.

Fourteen women (38%) who began breastfeeding said that they made no advance preparation for breastfeeding their babies. Others suggested that the breasts should be massaged and washed often.

When breastfeeding, most women ate their normal meals, but supplemented their diet with extra vitamins, minerals and tonics, and increased their intake of meat, vegetables, eggs and fruit. Six women drank milk, a drink that is generally not popular in Thailand where a large part of the adult population are lactose intolerant (Keusch et al., 1969;

¹ In a recent article, Gussler and Briesemeister (1980) argue that insufficient milk is extremely common among urban women particularly in the developing countries. As we pointed out in a response to their paper (Greiner et al., 1981), they failed to include the early introduction of bottle feeding among the reasons accounting for this phenomenon. This is clearly why these women have insufficient milk within a few days or weeks after childbirth.

Kretchmer, 1972). Note however that it is not established whether or not lactose intolerance entirely precludes milk drinking (Stephenson and Latham, 1974). Doctors have recommended that the mother drink two to three glasses of warm milk to help her production of breast milk. In the past, companies even suggested drinking formula before each nursing (Greiner, 1975:72).

Two women recommended traditional Thai foods for nursing mothers. These include a vegetable soup (kāēng līāng) made from ginger root, and banana flowers (cf. Hanks, 1963:54).

Twelve women reported that they did not abstain from eating any foods normally in their diet. Other women specified a need to avoid hot, spicy, pickled, strong tasting foods, and alcohol. In addition, one woman said that she generally avoided all foods that the "old women" forbid such as ice and fruits. Ice either over-heats or over-cools the body, and is dangerous at certain times; fruits are not considered to give strength, and many of them also have cooling properties (Hanks, 1963:22).¹

It would not be difficult for sophisticated Bangkok professional women to combine food regulations for lactation from a western and a traditional medical system. The systems in this instance could complement each other, with the women choosing western food supplements such as vitamins and tonics while maintaining traditional food prohibitions.

The fact that breastfeeding is associated with problems, both real and imagined, is a serious constraint on the options open to Bangkok women. For, the people who can solve the problems and provide needed support are not readily available. The stress and anxiety of pursuing a career in Bangkok may also reduce a woman's confidence to the point where she may be truly unable to nurse her child. It is also a very common idea that only women who are exceptionally healthy can breastfeed. (This is a particularly strange belief when these women know that servants and low income mothers are among those who breastfeed successfully.) Women commonly volunteered the information that they were not well enough to breastfeed. The most critical information to communicate to the women choosing to breastfeed, is the relation between the amount of milk the mother produces, and the amount of supplements in the form of solid food and infant formula that the baby is given. The cycle of formula supplements and diminishing supply of breast milk often begins within a few days of the baby's birth.

¹ Generally in Thailand, postpartum food restrictions are more in evidence than food restrictions during pregnancy. However, authors often fail to distinguish between food beliefs and actual dietary intakes. For example, while the hot/cold system is a salient cultural pattern in many parts of Thailand, it can best be thought of as a reference system rather than as a determinant of food choices.

5.3 Medical Facilities

Thai hospitals are not ideally suited for the establishment of a nursing relationship. Past surveys have shown that urban women who deliver in modern health facilities breastfeed consistently less than those who deliver at home (Knodel and Debavalya, 1980:69). The attitude of the western trained medical personnel may often be negative toward breastfeeding, and may contribute to the decline of breastfeeding because of inappropriate or inadequate training in lactation management.¹ Further, the doctors and hospitals have been most receptive to commercial formula companies. Nevertheless, Western trained doctors and hospitals are increasingly respected, even in rural areas of Thailand (Riley, 1974).

Although Thailand's granny midwives (mp tam yae) may deliver many babies as successfully as western trained medical specialists, they are not the preferred practitioners in urban settings, and the knowledge and experience of these indigenous practitioners is derided in urban centers. The professional women of Bangkok clearly preferred hospital deliveries, with only 3 of the 72 babies born at home. Most women remained in hospital for seven or nine days,² with the remainder of the women returning home after a shorter stay. This preference for a seven or nine day stay continued for subsequent children. For the birth of their first child, most women (18) said that they gave birth naturally without the use of instruments or anesthesia, or had a forceps delivery (12 women). Seven women had their first child by Caesarean section. Table 3 shows the method of delivery for all the children.

Table 3. Method of Delivery

	1st child	2nd child	3rd child	4th child	Totals
Natural	18	10	6	4	38
Forceps	12	6	1	0	19
Caesarean	7	4	3	1	15
Totals	37	20	10	5	N=72

¹Western medical professionals are recognizing the need to become better informed on the management of lactation. Publications providing such information are in great demand in American medical schools (see for example Psiaki et al., 1977). Winikoff and Baer (1980) review evidence that changes in hospital practices can make a difference in the rate of initiation of breastfeeding.

²It is interesting to note that seven or nine days is the most common duration for "lying by the fire" after childbirth in rural villages. This practice completes the birth experience and is said to dry out the uterus (cf. Hanks, 1963; Attagara, 1967).

Note that 15 children (21%) were born by Caesarean section, a high percentage compared to averages in countries such as Holland (2-4%), and even the range of 10-22% in American hospitals (Pritchard and Macdonald, 1980:1082). One woman said that she chose to have her babies by Caesarean section because "she could not stand the pain of a natural delivery." This stated reason is difficult to believe, considering the painful recovery following a Caesarean section. However, in my association with these women, those having Caesarean sections commonly scheduled them for 3 p.m. on a Friday afternoon, with their government leave of absence of 45 days beginning the following Monday. Women who had their first baby by Caesarean section had all subsequent births by this method, and were convinced that this was the only alternative open to them.

Most deliveries (61) were not accompanied by drugs to prevent or reduce the amount of breast milk, although a few women recalled an injection to "dry up" their milk supply. Before the mother's breast milk came in on the second or third day after birth, most babies were fed infant formula regardless of whether or not the mother intended to breastfeed. In an interesting study on the effect of artificial feeding in a Bangkok hospital newborn nursery, it was found that more mothers were persuaded to use infant formula after their babies were formula fed in hospital. Those mothers who entered hospital undecided about how to feed their infants were more influenced than those who had already decided how to feed their infants before entering the hospital (Kietthabthew, 1980). Mothers report that their babies were given water or glucose from a bottle in the hospital nursery.

The hospital setting, then, is clearly not conducive to breastfeeding. The women reported that their doctors gave them advice on infant formula, but did not discuss breastfeeding except in the pathological sense of "curing" abscesses. The relatively long hospital stay could be responsible for training the infant to receive nourishment from the bottle, a much simpler process for the baby and the hospital staff. The high incidence of Caesarean sections might also influence these decisions.

5.4 Promotion of Infant Formula

A factor closely related to the influence of hospitals and their medical staff is the promotion of infant formula. The promotional activities and advertising campaigns of the multinational milk companies is the subject of Greiner's disturbing study, "The Promotion of Bottle Feeding by Multinational Corporations: How Advertising and the Health Professions Have Contributed" (Greiner, 1975). In Thailand in 1974, ads for formula were in movie theaters and newspapers, and on billboards, radio and T.V. Greiner looked at 258 issues of 19 different Thai publications and found 52 issues contained ads for infant foods (second only to the Middle East in prevalence, Greiner 1975:5). The support given to formula promotion by private and clinic doctors is probably more effective in influencing these Bangkok professional women than consumer advertising. Companies may provide a doctor with

free samples, literature and paper products such as clinic cards or growth charts with pictures of their products in the corner. Other strategies include the use of saleswomen dressed as nurses, the distribution of free samples of formula to doctors, clinics and hospitals, and baby contests for formula fed babies (Greiner, 1975:77). Recent regulations which some infant companies adhere to limit direct promotional advertising to the consumer. As yet, the regulations are inadequately monitored.¹

Most mothers purchased infant formula and extolled the virtues of the brands they chose. Nineteen women (51%) chose S26, an expensive American Home Products brand put out by Wyeth Laboratories. Two Nestle products followed in popularity--Lactogen Full Protein, and Bear Brand put out by a subsidiary company, the Bernese Alps Milk Company of Switzerland. Similac, Carnation, SMA, and Klim were also mentioned as preferred brands.

These products must have captured a large percentage of the very lucrative Thai market. Since most women report that they followed the advice of their doctors in choosing formula, S26 must have the support of Bangkok's medical profession. Greiner cites an ad in the Philippines for S26, which claims that "S26 protects like mother's milk," and "S26 protects baby against infections" (Greiner, 1975:10). These Bangkok women often noted that the formula they chose would protect their babies against infection.

Nestle products are very popular in Southeast Asia, as in other parts of the world. In an internal Nestle bulletin, the company reports on their operation in Thailand. "The high birth rates permit a rapid expansion in the domain of infant nutrition; the Nestle products have in particular acquired in 1970 market leadership, thanks to their quality, the efforts of the nurses, and their contacts with the medical sector in the entire country" (Bulletin Nestle No. 3, 1971). This study supports their optimism, for Nestle, with its wide range of products, has something for everybody. Thirteen women (35%) use Nestle products --Lactogen and Bear Brand. Mothers using Lactogen specified that they used Lactogen Full Protein, and ads targeted at doctors claim that with this product, a mother cannot over-dilute the product (Greiner, 1975, ad on p. 57).

Nestle products cover the full range of products for mothers of different incomes and persuasion. Many mothers used a Bear Brand

¹The fourth draft of the International Code of Marketing of Breast Milk Substitutes and related products states that there should be no advertising and promotion of these products to the public or to mothers in health care facilities. Advocacy groups monitoring the industry's compliance list unacceptable promotion in many countries including Thailand where full page color advertisements for P-7 formula appeared in popular magazines (July, 1980), and Nespray full cream milk was advertised on T.V. as a breast milk supplement (January, 1981).

formula lauding its "richness." For lower income families, Bear Brand also produces a popular brand of full cream sweetened condensed milk. This product has a picture of a mother bear feeding a baby bear with a large feeding bottle, and the warning not to give this milk to infants, written in thin letters on the side of the tin. Bear Brand states that this milk is suitable for infants over twelve months of age, and nursing mothers. Another popular sweetened condensed milk carries a similar warning written vertically up the side of a striped tin, almost invisible to the naked eye. Sweetened condensed milk, however, is of little concern to these Bangkok professional women. They can afford the best expensive imported infant formula and know that sweetened condensed milk is not suitable for infants.

Most women did not change the brand of formula they gave to their children unless the baby was constipated or had diarrhea. Others felt that as their babies grew, their needs changed and they should be given milk appropriate for an older child. In the decision to shift brands, or in any other questions concerning formula, 24 women (65%) relied on instruction booklets received from the infant formula company. They reported finding the booklets quite helpful.

Their babies are fed on schedule, according to the mothers, most commonly 5 or 6 times a day. The regularity and scheduling of bottle feeding is an integral and important part of infant feeding. These women reported that infant formula is valuable for the child. Over half reported that in their opinion, the formula they chose provided the best possible nutrition for the child.

It might be possible to view these milk companies as simply providing an important alternative to these mothers, an alternative compatible with their professional working schedules. On the other hand, unethical marketing procedures have been used in Thailand and in other developing countries, and are of continuing concern to those interested in infant nutrition.

5.5 Employment

A factor that appears to limit the options of these women is their employment patterns. Unlike rural women whose child care responsibilities can easily be adjusted to fit the mother's subsistence activities (cf. Nerlove, 1974), these career women cannot keep their infants with them as they work. They work at high status, modern, visible jobs, where there is no provision for nurseries, nor is there any demand for them at present. Even the urban poor may have more opportunity to keep their children with them if they work at home making hats, flower garlands, or desserts to sell on the streets.

These women report great pride in their careers, and in the civil service rank they have attained. They report that it would be difficult to advance in the bureaucracy or even maintain their seniority if they took off more than their normal maternity leave of 45 days. Women who have been working for more than 180 days are entitled to receive

30 days pay in addition to 60 days (including holidays) unpaid maternity leave. But women workers may be required to sign work contracts agreeing to waive their maternity rights (Pruekpongsawalee, 1980:18). These labor laws apply to women with regular salaries, and not to day laborers or self employed women. These professional women view infant formula as the only possible answer for working mothers. Under present working conditions, they may be right.

Efforts to promote government sponsored day-care centers have failed due to the "...absence of definite government policies regarding this issue" (SEADAG Reports 1975:9). During a seminar on women wage earners in Thailand, a suggestion was made that day-care centers should be established by employers hiring a certain number of women with children. Participants quickly pointed out that this would probably result in employers discriminating against women with children in their hiring (SEADAG Reports 1975:9).¹

Of interest here is the rapidity with which Thai professional women returned to full time employment after the birth of their babies. After the birth of their first child, most of the women (86%) returned to full time work at the end of their 45 day leave or sooner. The remaining women were back at work two weeks later. This pattern continues for later children, with all women reporting back to work by two months after the birth of their babies. Nevertheless, very few women used those first two months to breastfeed their infants.

I have already noted the relatively high status of Thai women, and their employment in important sectors of the economy. Is the economic liberation of women tied to bottle feeding?² The Hanks reported in 1958 the exhilaration that Thai urban women find when engaged in stimulating occupations beyond household duties. In this sense, bottle feeding and early weaning can be viewed as a means of escape from domestic burdens (Hanks and Hanks, 1958:448-9). A shift to breastfeeding under present conditions would be viewed as a return to undesirable domestic labor.

5.6 Bottles as Status Symbols

One factor influencing the popularity of bottle feeding is the most difficult to document, that is, bottle and breastfeeding as status

¹Their fears are probably accurate. Lim's work on the electronics multinationals in Southeast Asia showed that the corporations are reluctant to pay the maternity benefits required by law and also more likely to lay off women workers than men (Lim, 1978:12,20). After the maternity benefits were decreased for women in the Philippines, a personnel director at a textile factory is reported to have said that "this made it profitable to hire women again."

²Gussler and Briesemeister's article (see footnote, p. 62) infers that the decline in breastfeeding is inevitable. Movies by Nestle and Ross Labs link the use of infant formula to the need for women to work outside the home. The problems of breastfeeding and working women are complex and are explored in more detail in Van Esterik and Greiner, 1981.

symbols. There was an assumption behind most discussions on this subject, that bottle feeding was perceived as more modern, progressive, western and scientific than breastfeeding, which was often referred to as animal-like behavior. This generalization is consistent with these research results, although more clarification is needed on the concept of status symbol and the use of symbolic analysis in explaining food habits before we can probe deeper beneath these cliché statements.

In the views of these women, bottle feeding with infant formula is part of a "package" of modernized technology unavailable to peasants and urban poor who breastfeed because they cannot afford more appropriate foods. In a Thai question which combines the notion of appropriateness and popularity of infant feeding patterns for upper, middle, and lower class women, more than three-quarters of these women defined the appropriate and therefore most popular infant feeding methods for upper and middle class families as infant formula, with only two women choosing breastfeeding as a suitable method for middle and upper class women. Most women (68%) thought that the "lower income group" should breastfeed. Further, 18 women (49%) felt that sweetened condensed milk is appropriate for the lower classes to use for their infants. This suggests that breastfeeding is perceived as a "lower class" method of infant feeding, a common sense observation confirmed in many personal encounters. What is disturbing is the perception of sweetened condensed milk, a product advertised as unsuitable for babies, as a lower class substitute for infant formula.

6. Concluding Questions

A study of this size and design raises more questions than it answers. Rather than state conclusions, I will raise additional questions which may have policy implications for programs designed to improve infant nutrition in Thailand.

1. How does knowledge of the benefits of breastfeeding affect the decision to breastfeed?

I asked a class of university students (Thammasat University, Bangkok) in a course on child welfare, how they intended to feed their infants. After an informal discussion on the subject in Thai, twelve girls submitted brief statements (in Thai) regarding their intention. None of these girls have had babies, but they indicate that they are aware of the benefits of breastfeeding. Five girls stated that they intended to breastfeed for the following reasons:

"The baby should be fed with breast milk. It provides close contact between the mother and the baby; and this does not happen when the baby is fed with canned milk. In breast feeding, the baby will be held and this will bring love and affection between mother and child. If the child is fed with canned milk, it might not have the same affectionate feeling from the mother because there is less close contact..."

And another student writes:

"Breast feeding is very beneficial for the baby. The quality of the mother's milk is such that it does not give the baby indigestion. It gives the baby more nutrients. It is also mentally beneficial, since it binds the mother and the child together with affection..."

They generally recognize the economic advantages of breastfeeding over formula, citing this as one reason for combining breastfeeding with formula. In this regard, a student argues:

"When the mother is working during the daytime, the baby should be given powdered milk (formula). During the period that the mother is not working, the baby should be fed breast milk. The milk comes naturally, so it is a waste not to use it. Also the mother's milk has more nutrients than the canned milk. Breast feeding also helps in putting off menstruation which is helpful for birth control, even though it only helps at this stage. Breast feeding also helps the mother take care of herself and keep herself healthy."

In the same vein, a student notes that a woman needs to work at a job to "enable her to afford the powdered milk." Even before these girls have experienced motherhood, they are aware of the cost involved in providing imported formula for babies. Yet, their comments stress the emotional benefits of breastfeeding over the economic. As one student puts it:

"One's child is one's descendant, and therefore the mother must 'give' to him. Breast milk is one thing that will keep the child alive, and healthy, and make him feel motherly affection and close contact..."

Although they have not faced the prospect of full time employment along with motherhood, these girls assume that a schedule can be worked out combining breastfeeding with formula. Two girls who said that they would not breastfeed their babies, feared that their health would not be good enough, and that their milk would lack nutrients which would be available in formula. These impressions suggest that the benefits of breastfeeding are fairly widely known among young women in Bangkok. In a recent study of the relationship between mothers' attitudes toward breastfeeding and infant feeding practices, Temchareon et al. found that both mothers who breastfed and mothers who bottle fed had favorable attitudes toward breastfeeding (1980:548). Clearly, attitudes toward breastfeeding do not predict breastfeeding behavior. Similarly, these statements cannot show how knowledge about breastfeeding will affect the decisions made by these girls when they become mothers. However, many of these women will probably not breastfeed regardless of what they know about the superiority of breast milk.

2. What suggestions would working mothers in civil service positions make to improve infant feeding practices?

Since many of the women in this survey have jobs involving planning and administering public policy, it is possible that their views on infant feeding could influence policy decisions. Their views summarized here reflect biases that should be taken into account in planning programs to improve infant nutrition.

The women suggested that for the Bangkok area, breastfeeding should be advertised in posters and pictures, but at the same time many of them qualified this with the comment that those who are able to breastfeed, should. They also advised that poor people should not use milk without high nutritional value. They had no suggestions as to how this could be accomplished, since they were aware that the cost of imported infant formula is beyond the reach of most of the urban poor. Instead, they characterize the urban poor as having "too many children that they are unable to care for. To help them, one has to reach them individually like visiting at their homes and demonstrating what should be done." They also pointed out that lower class people do not pay attention to such things as cleaning utensils, and sterilizing bottles, ignoring the fact that many of the Bangkok slum dwellers have only communal, contaminated water supplies available to them, and constraints on the amount of fuel they can afford.

For rural mothers, the Bangkok women suggest that they be taught the advantages of breastfeeding. From studies of rural Thai communities, it is clear that rural women know much more about the maintenance of a copious supply of milk than the Bangkok professional women. Further, they have the support of close relatives and friends who assume they will be good nursing mothers and know how to insure that they will be. The Bangkok women suggested teaching rural mothers the methods of good child care, the importance of proper nutrition before and after the birth of their babies, and the proper respect for public health officials. I have noted elsewhere (Van Esterik, 1976) that these public health nurses, trained in Bangkok, often carry with them the Bangkok disdain of "peasants," and in some cases, the concession to sell the more expensive brands of sweetened condensed milk. These Bangkok women do state that it is important for villagers to breastfeed, pointing out that it is easier for them to combine their work with nursing their babies. Several Bangkok women suggested that the peasants should schedule their nursing on a more regular basis. They suggested that these changes might be accomplished through an advertising campaign using T.V., radio, posters and movies.

3. Do working women really have any choices of infant feeding methods?

Certainly there is a choice in the first six weeks of an infant's life before the mother returns to work. Even after returning to work, there are solutions which could be found short of total reliance on formula. What, then, are the options that working women might consider?

The simplest solution, and the most popular choice, is the exclusive use of infant formula from birth. This option clearly requires a large cash outlay and is only available to working women with substantial income. But this behavior reinforces the idea of bottle feeding as a modern progressive alternative, and may influence the choices made by rural women or urban slum dwellers in the future.

A second option would be exclusive breastfeeding for the first six weeks, and then substituting expressed breast milk or other breast milk substitutes during the day when the mother returns to work. The mother could nurse her child in the morning and evening, and on weekends. This more complicated mixed feeding solution is less practical and not acceptable to these women. Breastfeeding is not perceived of as important enough to go to all that trouble.

A third option might be to supplement breast milk with formula after each feeding. Then the mother could wean the child totally when she returns to regular full time work. This option is common, but it is detrimental to the maintenance of breastfeeding as an available option, because it supports the idea that breastfeeding is always associated with problems, particularly insufficient milk. This option would result in a steadily diminished milk supply.

A fourth option is really incompatible with the mothers' stated view of good child care, but it may actually occur. That is, the use of a wet nurse while the mother is at work. This option could not be publicized or actively encouraged as a valuable strategy at present. It would be interesting to know more about the use of wet nurses, but the fieldwork would be very difficult to undertake.

Underlying these popular solutions is the common idea that if a mother is going to return to work, it is better to introduce bottle feeding as soon as possible to avoid possible problems later on. Working women feel they need to establish the bottle feeding habit early. Breastfeeding only complicates the problem.

4. How could more options be made available to these women?

Additional options would require changes in government and civil service policy, and only the strongest motivation for breastfeeding on the part of working women would influence this policy. At present, there appears to be no such motivation, or rather none among my informants. One option would require a longer maternity leave with no loss in seniority. A woman, then, would be able to nurse her child exclusively until returning to work. Additionally, government supported nurseries could be set up, with provision for two or three nursing breaks in a working day. Government supported creches are most common in countries based on a socialist economic system (cf. Richardson, 1975). Considering the importance of women in the labor force in Thailand, it is surprising that such plans have not been successfully implemented. However, considering the general disinterest in breastfeeding among the elite opinion leaders, and the lack of knowledge and

support available to women who choose to breastfeed, such a solution is unlikely in the near future. In 1974 there appeared to be little motivation to push for changes in the labor laws.

5. How effective are programs to promote breastfeeding among Thai professional women likely to be?

Certain features of Thai society would suggest that there is potential for supporting breastfeeding if more women wanted this option. The flexibility of Thai family structure (S. Embree, 1969; Hanks, 1972) could easily permit a doula unrelated to the mother to live with the family and be treated as a distant relative. A doula, or a person providing support and information for the new mother (Raphael, 1976), could be important in the early weeks after birth.

If the training that Thai doctors receive, both in the west and in Thailand, emphasized the advantages of breastfeeding as well as the dangers and benefits of infant formulas, the medical facilities could be accommodated to handle nursing mothers (cf. Winikoff and Baer, 1980). Those medical personnel who do support breastfeeding could concentrate attention on information of critical importance to the women attempting to breastfeed; that is, the relation of supplements to mother's milk supply. At present, a critical question is the influence that the commercial milk companies have on the medical profession in Thailand.

The fact that the Thai Department of Health already focuses funding and personnel on maternal and child health as a priority issue, could be potential support for the maintenance of breastfeeding as an option. Further, all the women interviewed expressed a great interest in and knowledge about nutrition. By publicizing the nutritional advantages of breast milk, more women might be encouraged to reconsider breastfeeding as an option. These women who shared their thoughts with me, stressed the fact that they would make the decision on the method of feeding their infant on their own. The independence of these women and their relatively high status¹ suggests that they would consider alternate methods of feeding if breastfeeding were viewed as being "worth the trouble."

¹In a recent dissertation, Brack argues that breastfeeding decreases when women's social power decreases relative to that of men in their own groups. For women to succeed with breastfeeding, they also need to hold positive values about the act. Although these women have relatively high status, their values about breastfeeding are quite negative. For example, a Thai professional woman speaking against the Nestle boycott argued that the supporters of the boycott do not know "what it means to have to breastfeed your baby." She felt that Thai women needed freedom to enjoy sexual activity, and Thai men didn't like to have sex with a woman "whose breasts dripped with milk."

7. Conclusion: Studying the Elite

Most discussions of bottle feeding with infant formula focus on the urban poor in developing countries, where there is abundant evidence that the products are misused or otherwise harmful. The infant formula companies argue that they do not advertise to these segments of the population, but to upper class women who work and who use infant formula without difficulties. Because of hospital practices and consumer advertising in cities like Bangkok, knowledge of bottles and infant formula is certainly not confined to the upper income groups, nor I am sure would marketing companies ever claim it was. Nevertheless, we know very little about the practices and beliefs of the women to whom infant formula companies claim to be directing their advertising. Why study elite women if their use of infant formula is unlikely to contribute to infant malnutrition?

First, elite professional women are part of a category of economically advantaged, highly educated urban women that we know very little about. But studies have shown that the duration of breastfeeding is usually shortest among well educated professional women in developing countries (Hofvander, 1979:69). The WHO collaborative study on breastfeeding showed that wealthier urban women breastfeed less often and for a shorter duration of time than rural or urban poor women. For example, in the Philippines and Guatemala, of those women who ever breastfed, over 50% weaned their children by the second month of life (WHO, 1981:33). We would predict, then, that elite professional women in Bangkok would not be supportive of breastfeeding and might even have negative attitudes towards it. We need to know the content and context of these negative attitudes, for elite women may be a source of culturally specific negative attitudes towards breastfeeding.

For example, elite women are most likely to patronize the best known and most influential medical personnel in the country. Their attitudes and practices would further reinforce the support for artificial feeding in the medical profession. The medical profession would then be less likely to press for changes in hospital practices which would be beneficial for breastfeeding mothers.

It is the ideas and attitudes of the elite that can be most widely communicated in any social system. For they are literate, articulate, and have access to more communication channels than the poor. In Ardener's terms, elite women are the least "muted" of the muted group of women (Ardener, 1977:3). To the extent that Thai women influence national policy decisions at all, it is the elite, educated women who have the potential and opportunity for influencing health and labor policy. To understand the rationale behind policy decisions, we need to study those in power, not those who are powerless and cannot influence the decision-making process.

Finally, the beliefs and practices of the elite in developing countries set the reference standards defining what is modern and therefore desirable. Changes in infant feeding practices first involved

elite wealthy families in positions of political and economic power (Jelliffe and Jelliffe, 1978:213). They are the first bottle users, the innovators, and the opinion leaders.

Elite professional women are more likely to have contact with western countries and have opportunities to travel there for education or professional responsibilities. Their greater familiarity with western products and their experience using them contributes to the creation of expanded markets for consumer goods. Mulder defines Thailand's expanding upwardly mobile middle class as admiring everything that comes from abroad, and following the trends of fashion and consumerism, regardless of the future consequences for the society as a whole (1979: 17).¹ Although this work does not present evidence for the process of creating status symbols, it is clearly the elite women who must be understood if we are to explain the adaptation of modern western traits as markers of status in Bangkok today.

The elite act as a symbolic model for middle and lower class urbanites. This is not simply a process of emulation following one to one contact between higher and lower income women, although that contact is certainly a factor (for example, domestic servants, lower echelon civil servants, service people, etc.). Nor is it strictly a case of the "trickle down theory" in action, whereby innovations "trickle down" from the upper to the lower classes (cf. King, 1964). Clearly, innovations, including new infant feeding practices, have different meanings to different classes and groups. As trend setters and definers of modernity, their beliefs and practices are influential. And they will be equally influential if, as in Sweden, they become the vanguard of a trend back to breastfeeding (Hofvander, 1979:69). For, the elite professional mother and the poorest urban slum dweller are linked in the same system of social, economic, and political influences which contribute to infant malnutrition in developing countries.

¹Thais refer to artificial feeding as modern (jalern or than samaj). The first term connotes a steady improvement in character and prosperity, while the second means to follow the fashion, or fit oneself to the times. Mulder refers to the acquisition of specific technological items which demonstrate one's ability to "follow the fashion" as symbolic modernization (1979:167).

8. References Cited

- Ardener, E. Belief and the problem of women. In *Perceiving Women*. S. Ardener, ed. London: J. M. Dent and Sons (1977).
- Attagara, K. The Folk Religion of Ban Nai. Bangkok: Kurusapha Press (1967).
- Baer, E. C. and Winikoff, B. Breastfeeding, Program, Policy, and Research Issues. In *Studies in Family Planning* 12(4): (1981).
- Berg, A. The Nutrition Factor. Washington: Brookings Institute (1973).
- Brack, D. C. Why women breastfeed. PhD dissertation, City University of New York (1979).
- Burling, R. Hill Farms and Padi Fields. Englewood Cliffs: Prentice-Hall, Inc. (1965).
- Chodak, S. Societal Development. New York: Oxford University Press (1973).
- Cottingham, J. (ed.) Bottle Babies. Women's International Information and Communication Service, Switzerland (1976).
- Dhiravegin, L. The Power Elite in Thailand. *Southeast Asian Journal of Social Science* 3(1): 1-16 (1975).
- Embree, J. Thailand - A loosely structured social system. In *Loosely Structured Social Systems: Thailand in Comparative Perspective*. Hans-Dieter Evers, ed. Cultural Report Series No. 17, Yale University (1969).
- Evers, H-D. (ed.) *Loosely Structured Social Systems: Thailand in Comparative Perspective*. Cultural Report Series No. 17, Yale University (1969).
- Frontline. American baby food company to promote breastmilk. London: *War on Want* 17(1): 3 (1977).
- Gaither International. A study of infant feeding in Thailand. Report prepared for Bristol-Myers, Inc., Ross Laboratories and Wyeth International Ltd., Bangkok, Thailand (1980).
- Greiner, T. The promotion of bottle feeding by multinational corporations: How advertising and the health professions have contributed. *Cornell International Nutrition Monograph Series* No. 2, Cornell University, Ithaca (1975).
- Greiner, T. Regulation and education: Strategies for solving the bottle feeding problem. *Cornell International Nutrition Monograph Series* No. 4, Cornell University, Ithaca (1977).

- Greiner, T., Van Esterik, P. and Latham, M. C. The insufficient milk syndrome: An alternative explanation. *Medical Anthropology* 5(2): 233-247 (1981).
- Gussler, J. and Briesemeister, L. H. The insufficient milk syndrome: A biocultural explanation. *Medical Anthropology* 4(2): 3-24 (1980).
- Hanks, J. Maternity and its rituals in Bang Chan. Data Paper 51, Southeast Asia Program, Cornell University, Ithaca (1963).
- Hanks, L. M. Rice and Man. Chicago: Aldine (1972).
- Hanks, L. M. and Hanks, J. Equality Between the Sexes. *In* Women in the New Asia. Barbara Ward, ed. Paris: Unesco (1958).
- Hofvander, Y. Patterns of Breast Feeding and Weaning in Developing Countries. *In* The Mother/Child Dyad-Nutritional Aspects. L. Hambræus and S. Sjölin, eds. Stockholm: Almqvist and Wiksell International (1979).
- Jelliffe, D. B. and Jelliffe, E. F. P. Human Milk in the Modern World. Oxford: Oxford University Press (1978).
- Keusch, G. T., Troncale, F. J., Thavaramar, B., Prinyamont, P., Anderson, P. and Bhamarapravathi, N. Lactose deficiency in Thailand: Effect of prolonged lactose feeding. *Am. J. Clin. Nutr.* 22: 638-641 (1969).
- Kietthubthaw, P. The effect of artificial feeding in a hospital newborn nursery on infant feeding practice: A case study at Phramongkutklao Hospital. MA in medical social science, Mahidol University, Bangkok, Thailand (1980).
- King, C. W. Fashion adoption: A rebuttal to the "trickle down" theory. *In* Towards Scientific Marketing. S. Greyser, ed. Chicago: American Marketing Association (1964).
- Kirsch, A. T. Economy, Policy, and Religion in Thailand. *In* Change and Persistence in Thai Society. G. W. Skinner and A. T. Kirsch, eds. Ithaca: Cornell University Press (1975).
- Khanjanastithi, P. and Wray, J. Early protein-calorie malnutrition in slum areas of Bangkok municipality, 1970-71. *J. Med. Assn. of Thailand* 57: No. 71 (1974).
- Knodel, J. and Debavalya, N. Trends and differentials in breastfeeding in Thailand: An analysis of survey data, 1969-1979. Institute of Population Studies, Paper No. 36. Chulalongkorn University, Bangkok, Thailand (1980).
- Kretchmer, N. Lactose and lactase. *Scientific American* 227: No. 4 (1972).
- La Loubère, S. A New Historical Relation of the Kingdom of Siam, 2 vols. Translated from the French. London: T. Horne (1963).

- Latham, M. C. Introduction. In Regulation and Education: Strategies for Solving the Bottle Feeding Problem. T. Greiner, Cornell International Nutrition Monograph Series No. 4, Cornell University, Ithaca (1977).
- Ladas, A. Breastfeeding: The less available option. Monograph 25. J. Trop. Pediat. Environ. Child Health, London (1972).
- Lim, L. Y. C. Women workers in multinational corporations. Michigan Occasional Papers in Women's Studies 9 (1978).
- Moerman, M. Tradition, modernity and social change. In Man, State, and Society in Traditional Southeast Asia. R. Tilman, ed. New York: Praeger (1969).
- Muecke, M. Health care systems as socializing agents: Childbearing the North Thai and Western ways. Paper presented at the 74th Annual Meeting of the American Anthropological Association, San Francisco (1975).
- Mulder, N. Everyday life in Thailand: An interpretation. Editions Duang Kamol, Bangkok (1979).
- Muller, M. The Baby Killer. War on Want. London (1974).
- Nerlove, S. B. Women's workload and infant feeding practices: a relationship with demographic implications. Ethnology 13: 207-214 (1974).
- Nestle. Thailand '71. Bulletin Nestle, No. 3 (1971).
- Phillips, H. P. The culture of Siamese intellectuals. In Change and Persistence in Thai Society. G. W. Skinner and A. T. Kirsch, eds. Ithaca: Cornell University Press (1975).
- Post, J. E. Marketing and nutrition policy in LDC's: The case of infant formula. Boston University School of Management Research Program in Management and Public Policy. Working paper, mimeo (1976).
- Pritchard, J. A. and Macdonald, P. C. Williams Obstetrics (sixteenth edition). New York: Appleton-Century-Crofts (1980).
- Pruekpongsawalee, M. The position of women in labor law and social security in Thailand. Paper presented at the First Asian Congress of Labor Law and Social Security. Manila, Philippines (1980).
- Psiaki, D., Olson, C. and Kaplowitz, D. Current knowledge on breast feeding. Extension Publication, Cooperative Extension, Cornell University (1977).
- Raphael, D. The Tender Gift. New York: Schocken Books (1976).

- Richardson, J. L. Review of international legislation establishing nursing breaks. *J. Trop. Pediat. Environ. Child Health* 21(5): 249-258 (1975).
- Riley, J. N. Relationships between western and traditional Thai medicine. Paper presented at the American Anthropological Association Meetings, Mexico City (1974).
- Robinson, W. C. Economic policy and population changes in Thailand. Paper presented at the Association for Asian Studies Meetings in New York (1977).
- SEADAG Seminar. Women wage earners in Thailand. Pattaya, Thailand (1975).
- Stahlie, T. D. Thai children under four. Amsterdam: Free University (1959).
- Stephenson, L. S. and Latham, M. C. Lactose intolerance and milk consumption: the relation of tolerance to symptoms. *Am. J. Clin. Nutr.* 27: 296 (1974).
- Temchareon, P., Temchareon, P. and Sirivunaboot, P. Relationship between mother's attitudes toward breast feeding and types of feeding practices. *J. Med. Assn. of Thailand* 63(10): 548-552 (1980).
- Van Esterik, P. Lactation, nutrition, and changing cultural values: infant feeding practices in rural and urban Thailand. *In Development and Underdevelopment in Southeast Asia*. G. Means, ed. Canadian Society for Asian Studies, Ottawa (1976).
- Van Esterik, P. and Greiner, T. Breastfeeding and women's work: constraints and opportunities. *Studies in Family Planning* 12(4): 184-197 (1981).
- Winikoff, B. and Baer, E. The obstetrician's opportunity: Translating 'breast is best' from theory to practice. *Am. J. Obstet. Gynecol.* 138(1): 105-117 (1980).
- World Health Organization. Contemporary patterns of breast-feeding. Geneva: WHO (1981).
- Yamklinjung, P. The needs and problems of children and youth in four slums in Bangkok Chulalongkorn University Social Science Research Institute, Bangkok (1973).